



## Workshop Manual

Fox 2010 ➤

Fox 2014 ➤

SpaceFox 2011 ➤

**5 - Speed automated transmission (ASG) 0C3**

Edition 02.2017



## List of Workshop Manual Repair Groups

### Repair Group

- 00 - Technical data
- 30 - Clutch
- 34 - Controls, housing
- 35 - Gears, shafts
- 39 - Final drive - differential

Technical information should always be available to the foremen and mechanics, because their careful and constant adherence to the instructions is essential to ensure vehicle road-worthiness and safety. In addition, the normal basic safety precautions for working on motor vehicles must, as a matter of course, be observed.



## Contents

<b>00 - Technical data</b>	<b>1</b>
1 Identification	1
1.1 Gearbox identification	1
1.2 Prefix, Assignment, and gear ratio	1
1.3 Oil specifications, filling capacity	3
2 Transmission assembly scheme	4
2.1 Nomenclature	4
2.2 Gear ratios	5
3 Gearbox ratio "i"	6
3.1 Gear ratio calculation "i"	6
4 General repair instructions	7
4.1 Gearbox	7
4.2 Gaskets and retainers	7
4.3 Screws, nuts	8
4.4 Roller bearings	8
4.5 Adjustment shims	9
4.6 Synchronizer rings	9
<b>30 - Clutch</b>	<b>10</b>
1 Hydraulic system	10
1.1 Hydraulic system - assembly overview	10
1.2 Clutch slave cylinder - remove and install	11
2 Clutch drive mechanism	14
2.1 Clutch drive mechanism - assembly overview	14
3 Clutch	16
3.1 Clutch - assembly overview	16
3.2 Clutch - repair	17
<b>34 - Controls, housing</b>	<b>19</b>
1 Vehicle diagnostic and service information system	19
1.1 Diagnosis, measurement and information system - connect	19
2 Electronic components and installation locations	20
2.1 Electric and electronic components - overview	20
2.2 "Tiptronic" upshift switch on the steering wheel E438 and/or "Tiptronic" downshift switch on the steering wheel E439	22
2.3 Sensor 2 for gear detection G616	22
2.4 Gearbox input speed sender G182	23
2.5 Gear detection sensor G604	24
2.6 Diagnosis socket	26
2.7 Selector lever position display Y6	26
2.8 Automatic gearbox control unit J217	26
3 Selector lever	28
3.1 Selector lever - assembly overview	28
3.2 Selector lever handle - remove and install	29
3.3 Upper selector lever cover - remove and install	30
3.4 Selector lever - remove and install	31
3.5 Lower selector lever cover - remove and install	32
3.6 Selection lever boot - adjust	33
3.7 Selector lever operation - check	34
4 Gear selection mechanism - adjust	35
4.1 Gear selection mechanism - assembly overview	35
4.2 Gear selection mechanism - remove and install	37



4.3	Gear selection mechanism - components	45
4.4	Gear selection mechanism - repair	48
5	Transmission - remove and install	61
5.1	Transmission - remove and install	61
5.2	Gearbox - transport	71
6	Gearbox - disassemble and assemble	73
6.1	Gearbox - overview	73
6.2	gearbox - assembly overview	74
6.3	Gearbox housing cover and 5th gear	74
6.4	Clutch housing	76
6.5	Input shaft, planet pinion, differential, selection mechanism and selector forks	77
6.6	Input shaft, planet pinion, differential, selection mechanism and selector forks - disassemble and assemble	79
7	Gearbox oil level	87
7.1	Oil level - check	87
7.2	Oil level - replenish	87
8	Gear selector mechanism oil level	89
8.1	Oil level - check	89
8.2	Oil level - replenish	90
9	Gearbox and clutch housings	91
9.1	Transmission and clutch housings - repair	91
10	Selector forks	97
10.1	Selector forks - disassemble and assemble	97
<b>35</b>	<b>Gears, shafts</b>	<b>102</b>
1	Input shaft	102
1.1	Primary shaft - general overview of assembly	102
1.2	Input shaft - disassemble and assemble	105
2	Planet pinion	114
2.1	Pinion shaft - general overview of assembly	114
2.2	Planet pinion - disassemble and assemble	117
<b>39</b>	<b>Final drive - differential</b>	<b>123</b>
1	Drive flange	123
1.1	Left drive flange retainer (left side) - replace	123
1.2	Drive flange retainer (right side) - replace	126
2	Differential	129
2.1	Differential - general overview of assembly	129
2.2	Differential - disassemble and assemble	132
2.3	Differential - adjust	138



## 00 – Technical data

### 1 Identification

(VRL010075; Edition 02.2017)

⇒ ["1.1 Gearbox identification", page 1](#)

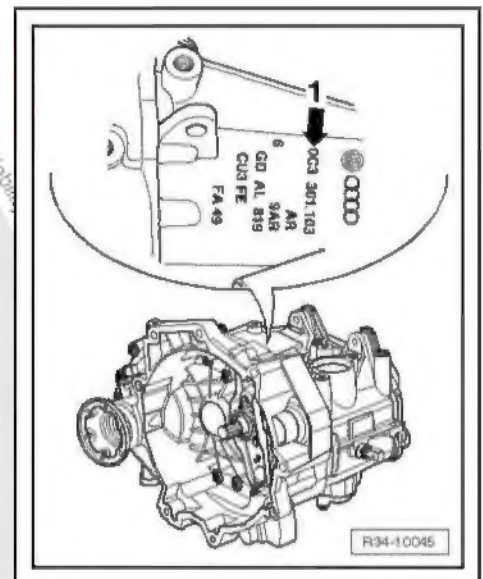
⇒ ["1.2 Prefix, Assignment, and gear ratio", page 1](#)

⇒ ["1.3 Oil specifications, filling capacity", page 3](#)

#### 1.1 Gearbox identification

Prefixes (Identification letters) and manufacturing date:

"5-speed automated transmission (ASG) 0C3" -arrow 1-



Gearbox prefix and manufacturing date -arrow 2-

Example:

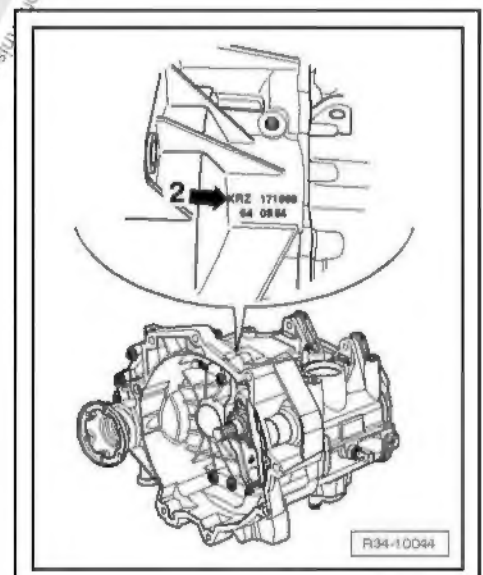
Example	KRZ	17	10	09
	Prefix	Day	Month	Production year
				2009

Supplementary data depend on the manufacturing:



Note

- ◆ *Eventual existing additional data are related to the manufacturing process.*
- ◆ *Transmission prefixes are also included on the vehicle identification plate.*



#### 1.2 Prefix, Assignment, and gear ratio

Automated transmission		0C3 5-speed		
Identification letters (prefix)		KRZ		NKY
Manufacturing	from	09.09	03.10	05.11
	to	06.14	07.14	07.14



Automated transmission		0C3 5-speed	
Identification letters (prefix)		KRZ	NKY
Assignment	Model	Fox 2010 ►	SpaceFox / Suran 2010 ►
	Engine	1.6 l - 74 kW	1.6 l - 74 kW
gearbox ratio Z <sub>2</sub> : Z <sub>1</sub> :	Differential	67 : 16 = 4.188	67 : 16 = 4.188

The following information can be found in: ⇒ Electronic Parts Catalog "ETKA"

- ◆ Individual gear ratios
- ◆ Specification of the clutch
- ◆ Gearbox oil (filling), or refer to ⇒ [page 3](#)

Automated transmission		0C3 5-speed	
Identification letters (prefix)		NSW	PCW
Manufacturing	from	04.12	08.14
	to	06.14	08.14
Assignment	Model	CrossFox 2013 ►	Fox 2015 ►
	Engine	1.6 l - 74 kW	1.6 l - 81/88 kW
gearbox ratio Z <sub>2</sub> : Z <sub>1</sub> :	Differential	61 : 14 = 4.357	61 : 14 = 4.357

The following information can be found in: ⇒ Electronic Parts Catalog "ETKA"

- ◆ Individual gear ratios
- ◆ Specification of the clutch
- ◆ Gearbox oil (filling), or refer to ⇒ [page 3](#)

Automated transmission		0C3 5-speed	
Identification letters (prefix)		PUE	QKG
Manufacturing	from	06.14	08.14
	to		
Assignment	Model	Fox 2015 ►	SpaceFox / Suran 2015 ►
	Engine	1.6 l - 81/88 kW	1.6 l - 74 kW
gearbox ratio Z <sub>2</sub> : Z <sub>1</sub> :	Differential	61 : 14 = 4.357	67 : 16 = 4.188

The following information can be found in: ⇒ Electronic Parts Catalog "ETKA"

- ◆ Individual gear ratios
- ◆ Specification of the clutch
- ◆ Gearbox oil (filling), or refer to ⇒ [page 3](#)
- ◆






Automated transmission		0C3 5-speed		
Identification letters (prefix)		QKG	QKJ	QKK
Manufacturing	from	03.14	03.14	05.14
	to			08.14
Assignment	Model	SpaceFox / Suran 2015 ►	SpaceFox 2014 ►	Fox 2014 ►
	Engine	1.6 l - 74 kW	1.6 l - 74 kW	1.6 l - 74 kW
gearbox ratio Z2: Z1:	Differential	67 : 16 = 4.188	67 : 16 = 4.188	61 : 14 = 4.357

The following information can be found in: ► Electronic Parts Catalog "ETKA"

- ◆ Individual gear ratios
- ◆ Specification of the clutch
- ◆ Gearbox oil (filling), or refer to ► [page 3](#)

### 1.3 Oil specifications, filling capacity



**WARNING**

- ◆ *When handling chemicals follow the safety instructions ⇒ Chemical Products Manual; Rep. gr. 00*
- ◆ *Assignment of Chemical Materials ⇒ Electronic Parts Catalogue "ETKA"*

Oil specification	Filling capacity
Lubricant oil for mechanical gearbox - G 052 512 A2- ⇒ Electronic Parts Catalogue "ETKA"	2.0 + 0.1 litres
High-performance lubricant oil for mechanical gearbox - G 052 527 A2- ⇒ Electronic Parts Catalogue "ETKA"	
Gear selection mechanism oil - G 052 512 S1- ⇒ Electronic Parts Catalogue "ETKA"	0.9 litres



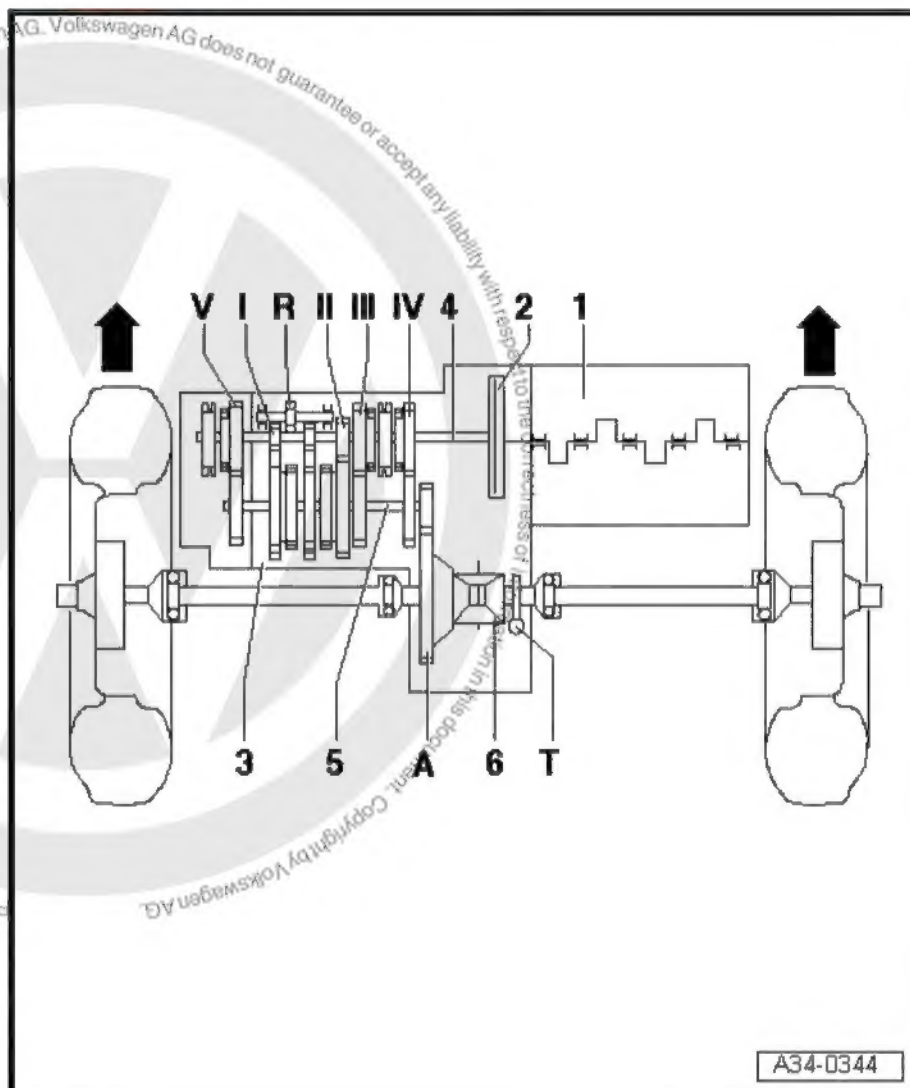
## 2 Transmission assembly scheme

⇒ "2.1 Nomenclature", page 4

⇒ "2.2 Gear ratios", page 5

### 2.1 Nomenclature

- 1 - Engine
- 2 - Clutch
- 3 - Automated transmission
- 4 - Input shaft/driving shaft
- 5 - Output shaft/planet pinion
- 6 - Differential



Note

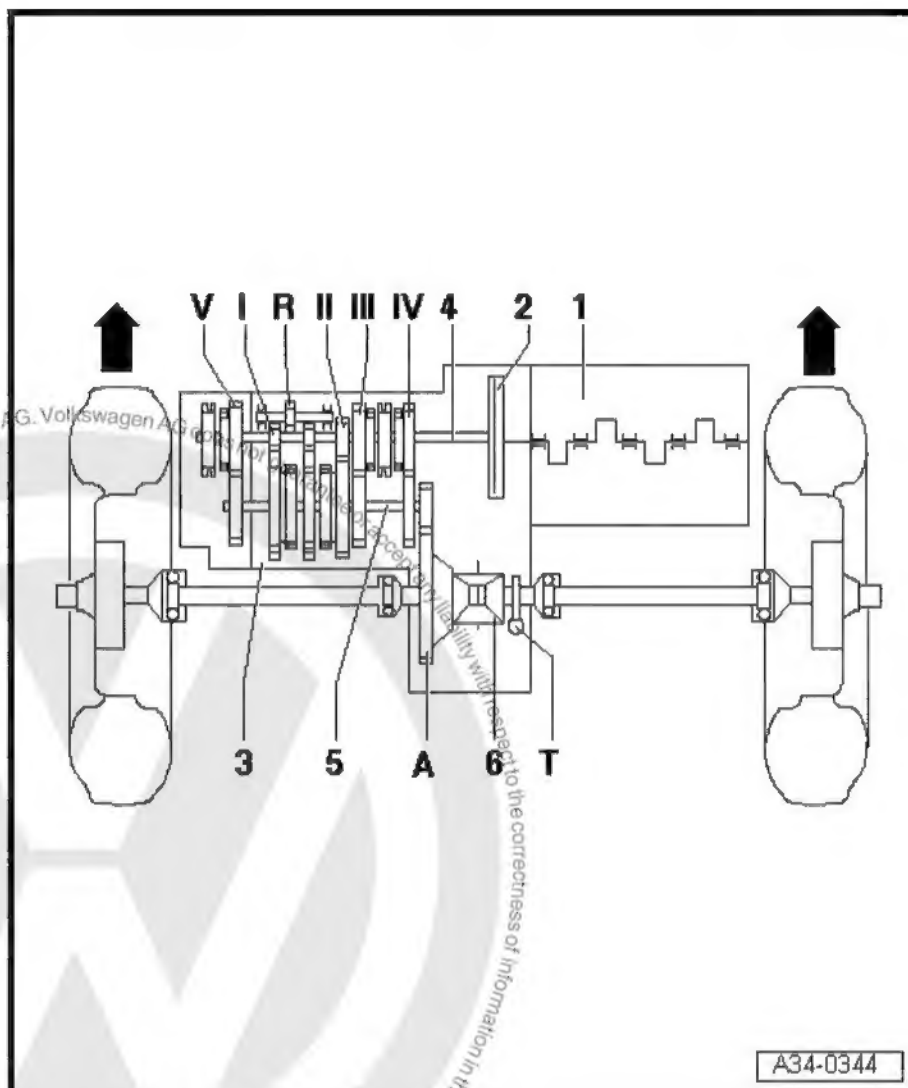
Arrows indicate run direction.





## 2.2 Gear ratios

- I - 1st gear
- II - 2nd gear
- III - 3rd gear
- IV - 4th gear
- V - 5th gear
- R - Reverse gear
- A - Sprocket
- T - Speedometer control
- ☐ For vehicles without ABS



Note

Arrows indicate run direction.



### 3 Gearbox ratio "i"

⇒ "3.1 Gear ratio calculationi", page 6

#### 3.1 Gear ratio calculation*"i"*

Example:

	5th gear	Sprocket
Driving gear	$ZG_1 = 50$	$ZA_1 = 18$
Driven gear	$ZG_2 = 37$	$ZA_2 = 65$

$$i = Z_2 : Z_1$$

$$i_G = \text{gear gearbox ratio} = ZG_2 : ZG_1 = 37 : 50 = 0.740$$

$$i_A = \text{differential gear ratio} = ZA_2 : ZA_1 = 65 : 18 = 3.611$$

$$i_{\text{total}} = \text{Total gear ratio} = i_G \times i_A = 0,740 \times 3,611 = 2,672$$

1)  $Z_1$  = Number of teeth on the driving gear  $Z_2$  = Number of teeth on the driven gear





## 4 General repair instructions

➔ ["4.1 Gearbox", page 7](#)

➔ ["4.2 Gaskets and retainers", page 7](#)

➔ ["4.3 Screws, nuts", page 8](#)

➔ ["4.4 Roller bearings", page 8](#)

➔ ["4.5 Adjustment shims", page 9](#)

➔ ["4.6 Synchronizer rings", page 9](#)

### 4.1 Gearbox



#### WARNING

*For achieving a correct and successful repair of the transmission, maximum strictness and cleanliness, as well as accessible tools in good conditions, are essential conditions. Obviously, all the normal basic safety rules also apply in repairs.*

*We put together here a series of indications applicable to several operations, which are usually dispersed along the Repair Manual. These indications apply to this Repair Manual.*

- ◆ *First, clean the union points and adjacent regions before separating them.*
  - ◆ *Put the disassembled parts on a clean base and cover them to prevent dirt. Use transparent film and paper. Do not use cloths that fray!*
  - ◆ *Assemble clean parts only: Remove parts from the packaging only immediately before their assembly.*
  - ◆ *Carefully cover or close open components, in case repair is not carried out immediately.*
- ◆ When assembling the transmission, pay attention on the correct seating of guide pins between engine and transmission.
  - ◆ Whenever the transmission is replaced, fill with oil until the lower edge of the filling hole.
  - ◆ Filling capacity and specification ➔ [page 1](#) .

### 4.2 Gaskets and retainers

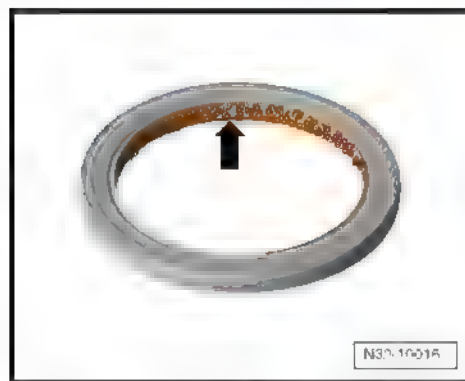


#### WARNING

- ◆ *When handling chemicals follow the safety instructions ➔ Chemical Products Manual; Rep. gr. 00*
- ◆ *Assignment of Chemical Materials ➔ Electronic Parts Catalogue "ETKA"*



- ◆ Always change O-rings, retainers and gaskets
- ◆ After removing the gaskets, check whether the stop surface has burrs or damage resulting from the assembly.
- ◆ Before installing the retainers, lubricate slightly the outer diameter and fill the gap between the sealing lips -arrow- with Grease - G 052 128 A1- up to half height.



#### 4.3 Screws, nuts



##### WARNING

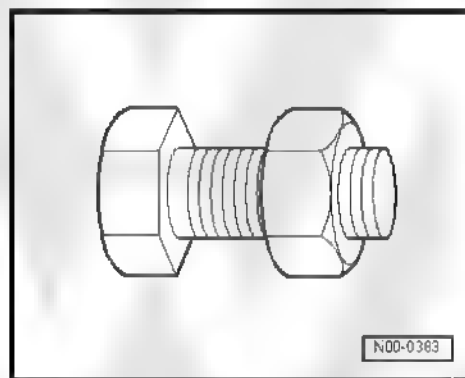
- ◆ *When handling chemicals follow the safety instructions ⇒ Chemical Products Manual; Rep. gr. 00*
- ◆ *Assignment of Chemical Materials ⇒ Electronic Parts Catalogue "ETKA"*

- ◆ Loosen and tighten cover and case fastening screws or nuts in a cross pattern and in stages.
- ◆ The tightening torques indicated apply to non-lubricated screws and nuts.
- ◆ The screw threads with locking paste must be cleaned with wire brush. Install screws with Locking paste - AMV 185 100 A1- .
- ◆ All the self-locking screw holes must be cleaned from locking paste residues with screw tap. Otherwise, there is the risk of breaking the screws when they are removed again.



##### WARNING

*Replace self-locking nuts and screws subject to angular torque.*



#### 4.4 Roller bearings

- ◆ Lubricate all the gearbox roller bearings with gear oil before installing them.
- ◆ Needle bearings must fit into the labelled part (highest thickness of the plate), towards the fitting tool.
- ◆ The tapered roller bearings installed in a same shaft must be replaced as a set. If possible, they must be supplied by the same manufacturer.
- ◆ To install, heat the inner rings up to approximately 100 °C.
- ◆ Do not change outside and inner rings on a roller bearing by the rings from another roller bearing with the same size. Roller bearings are installed in pairs

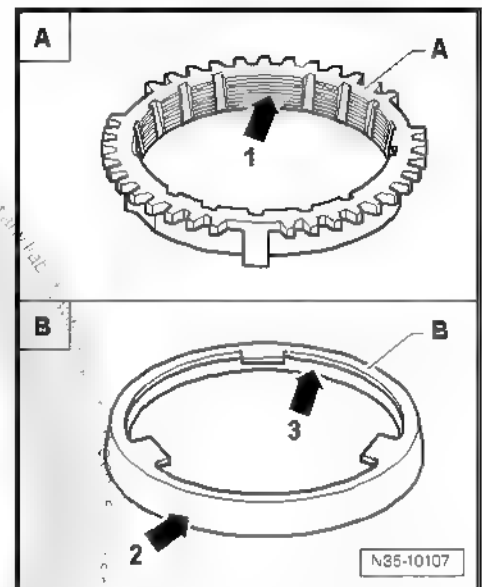


## 4.5 Adjustment shims

- ◆ Check the shim thicknesses in several places with micrometre. The existence of different tolerances enables calibrating the required shim thickness with accuracy.
- ◆ Check for burrs and damages.
- ◆ Only install adjustment shims in perfect conditions

## 4.6 Synchronizer rings

- ◆ They should not be inverted. When reusing synchronizer rings, always install them on the same gear pair.
- ◆ Check for wear, and change them, if required
- ◆ Lubricate with gear oil before installing.
- ◆ Check the splines -arrows- of the synchronizer ring -A- and the inner track for smooth areas (splines with wear).
- ◆ In the case of lines synchronizer rings, the lining must not be damaged.
- ◆ If an intermediate track -B- is installed, examine it at the outer friction areas -arrow 2- and inner friction areas -arrow 3-, for »splines«, »wear signs« and »blue colouring (due to over-heating)«
- ◆ Check the selector gear cone for »splines« and »signs of wear«.
- ◆ Install the synchronizer rings with gear oil.





## 30 – Clutch

### 1 Hydraulic system

➔ "1.1 Hydraulic system - assembly overview", page 10

➔ "1.2 Clutch slave cylinder - remove and install", page 11

#### 1.1 Hydraulic system - assembly overview



#### WARNING

- ◆ When handling chemicals follow the safety instructions ➔ Chemical Products Manual; Rep. gr. 00
- ◆ Assignment of Chemical Materials ➔ Electronic Parts Catalogue "ETKA"

#### 1 - Gear selection mechanism - adjust

- ☐ "Actuator Pack".
- ☐ Remove and install ➔ page 35 .
- ☐ Disassemble and assemble ➔ page 48 .

#### 2 - Flange/selector shaft set

- ☐ Non-removal of the transmission, the gear selection mechanism must not be separated.

#### 3 - Pressure tube

- ☐ Replace upon removal.
- ☐ Replace ➔ page 52 .
- ☐ After replacement, check and complete the tank oil level ➔ page 89 .

#### 4 - Hydraulic set

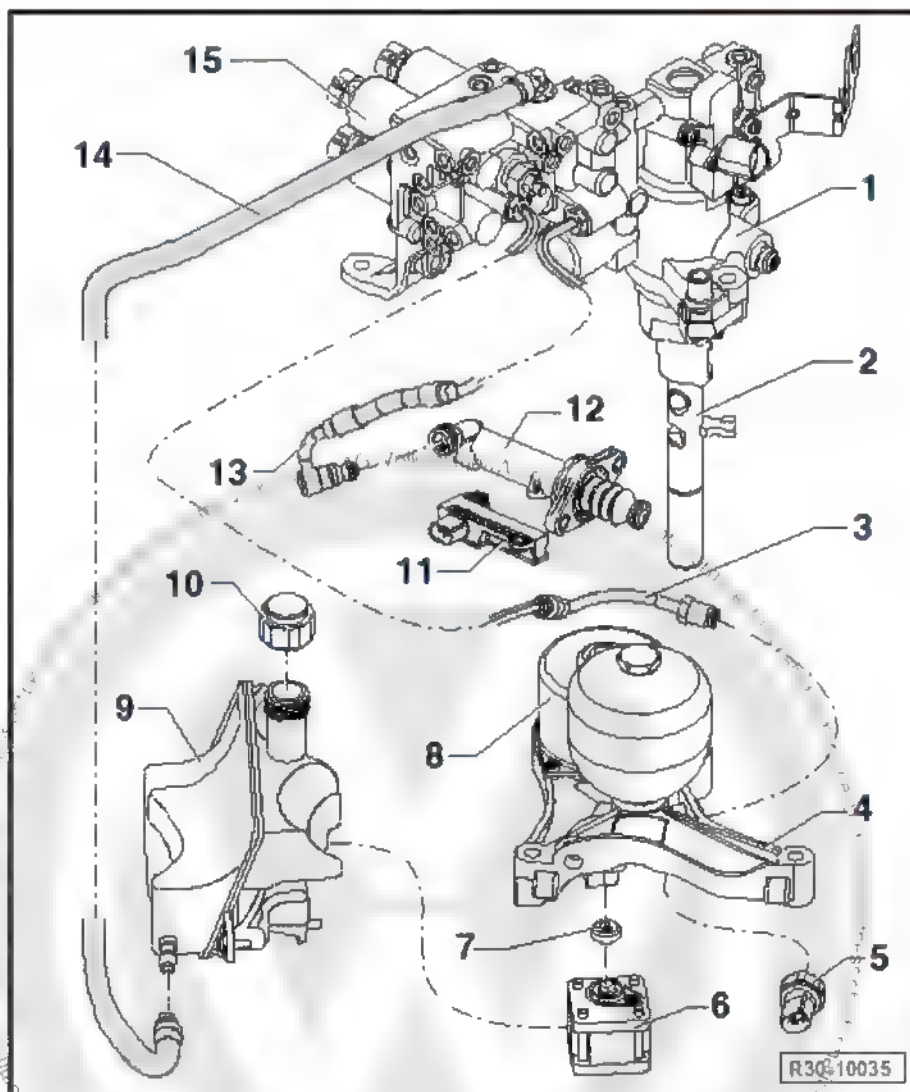
- ☐ "Power Pack".
- ☐ Remove and install ➔ page 35 .
- ☐ Disassemble and assemble ➔ page 48 .

#### 5 - Gearbox hydraulic pressure sensor - G270-

- ☐ Replace ➔ page 54 .
- ☐ Apply Nyogel - G 052 817 A1- to the contact pins.
- ☐ After replacement, check and complete the tank oil level ➔ page 89 .

#### 6 - Hydraulic gearbox pump - V387

- ☐ Remove and install ➔ page 56
- ☐ Assignment: ➔ Electronic Parts Catalog "ETKA"







- ☐ When replacement is necessary, the entire set "Electric motor and hydraulic pump" must be replaced.
- ☐ After replacement, check and complete the tank oil level ➔ [page 89](#) .

#### 7 - Coupling

- ☐ Replace if damaged

#### 8 - Electric motor for the Hydraulic gearbox pump - V387-

- ☐ Remove and install ➔ [page 55](#) .
- ☐ Apply Nyogel - G 052 817 A1- to the contact pins.
- ☐ Assignment: ➔ Electronic Parts Catalog "ETKA"
- ☐ When replacement is necessary, the entire set "Electric motor and hydraulic pump" must be replaced.

#### 9 - Hydraulic system oil reservoir

- ☐ Only use selector mechanism oil - G 052 512 S1- Assignment: ➔ Electronic Parts Catalog "ETKA"
- ☐ Remove and install ➔ [page 54](#) .
- ☐ Check and top up oil level. ➔ [page 89](#)

#### 10 - Reservoir cap

#### 11 - Clutch position sensor - G476-

- ☐ Assembly overview ➔ [page 14](#) .
- ☐ Assignment: ➔ Electronic Parts Catalogue "ETKA" .
- ☐ Apply Nyogel - G 052 817 A1- to the contact pins.

#### 12 - Hydraulic clutch slave cylinder

- ☐ Remove and install ➔ [page 11](#) .
- ☐ After installation, check and complete the tank oil level ➔ [page 89](#) .

#### 13 - High-pressure slave cylinder

- ☐ When removed from the "Actuator Pack" it must be removed.
- ☐ Replace ➔ [page 51](#) .
- ☐ After replacement, check and complete the tank oil level ➔ [page 89](#) .

#### 14 - Return pipe

- ☐ Handle with care!
- ☐ Replace ➔ [page 57](#) .
- ☐ After replacement, check and complete the tank oil level ➔ [page 89](#) .

#### 15 - Electro-valves set

The electro-valves set has the following components:

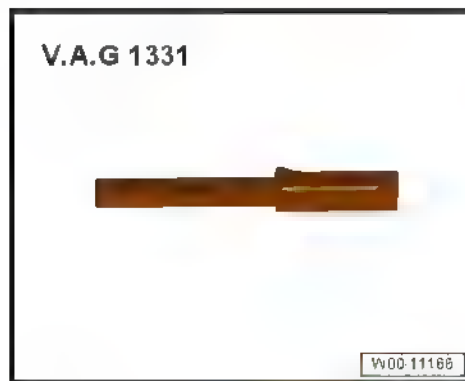
- ◆ Clutch actuator valve - N255- "EV0".
- ◆ Valve 1 for gear selection - N284- "EV1".
- ◆ Valve 2 for gear selection - N285- "EV2".
- ◆ Valve 3 for gear selection - N286- "EV3".
  - ☐ Remove and install ➔ [page 49](#) .
  - ☐ After installation, check and complete the tank oil level ➔ [page 89](#) .

## 1.2 Clutch slave cylinder - remove and install

Special tools and workshop equipment required



- ◆ Torque wrench - 5 to 50 Nm ( 1/2" drive) - VAG 1331-

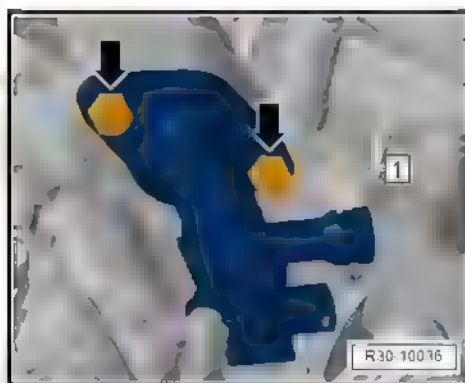


- ◆ Torque Wrench - 40 to 200 Nm (fit. 1/2" drive) - VAG 1332-



### 1.2.1 Removal

- Operate the handbrake.
- Turn vehicle on.
- Put the selector lever in position "N".
- Remove the gear selection mechanism [page 35](#)
- Remove the fastening screws -arrows- on the actuator slave cylinder -1-.
- Remove activation slave cylinder -1-.



### 1.2.2 Installation

Installation is performed in reverse to removal sequence, considering the following:

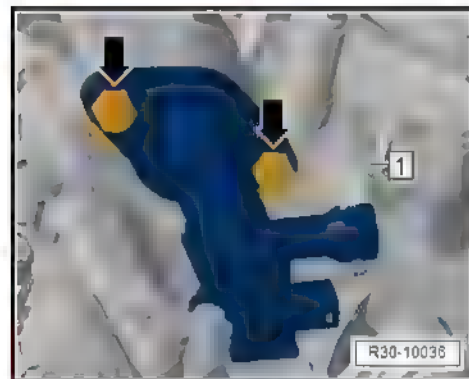


- Install and tighten the fastening screws -arrows- to the clutch actuator slave cylinder. Tightening torque, see [→ Item 11 \(page 15\)](#) .
- Install the gear selection mechanism [→ page 35](#) .
- Check and top up tank oil level [→ page 89](#)



**Note**

*After installation, it is necessary to make a basic adjustment to the hydraulic system⇒ Vehicle diagnostic tester.*





## 2 Clutch drive mechanism

➔ "2.1 Clutch drive mechanism - assembly overview", page 14

### 2.1 Clutch drive mechanism - assembly overview

#### 1 - Clutch roller bearing

- ☐ Remove and install with the clutch release lever ➔ [Item 3 \(page 14\)](#) and roller bearing's guide bushing ➔ [Item 5 \(page 14\)](#).
- ☐ Do not wash the clutch roller bearing, only clean it with cloth.
- ☐ Replace noisy roller bearings.

#### 2 - Bolts

- ☐ 5 Nm + 90°.
- ☐ Replace after each removal.

#### 3 - Clutch release lever

- ☐ Remove and install ➔ [page 15](#)
- ☐ Remove and install with the clutch roller bearing ➔ [Item 1 \(page 14\)](#) and roller bearing's guide bushing ➔ [Item 5 \(page 14\)](#).
- ☐ Lubricate the stop point on the spherical pin with Lubricating grease - G 000 100-.

#### 4 - Lever pressure lever

- ☐ Fasten on the clutch lever.

#### 5 - Roller bearing's guide bushing

- ☐ Remove and install ➔ [page 15](#)
- ☐ Remove and install with the clutch roller bearing ➔ [Item 1 \(page 14\)](#) and roller bearing's disengaging lever ➔ [Item 3 \(page 14\)](#).

#### 6 - Ball pin

- ☐ 20 Nm
- ☐ Lubricate with Lubricating grease - G 000 100-.

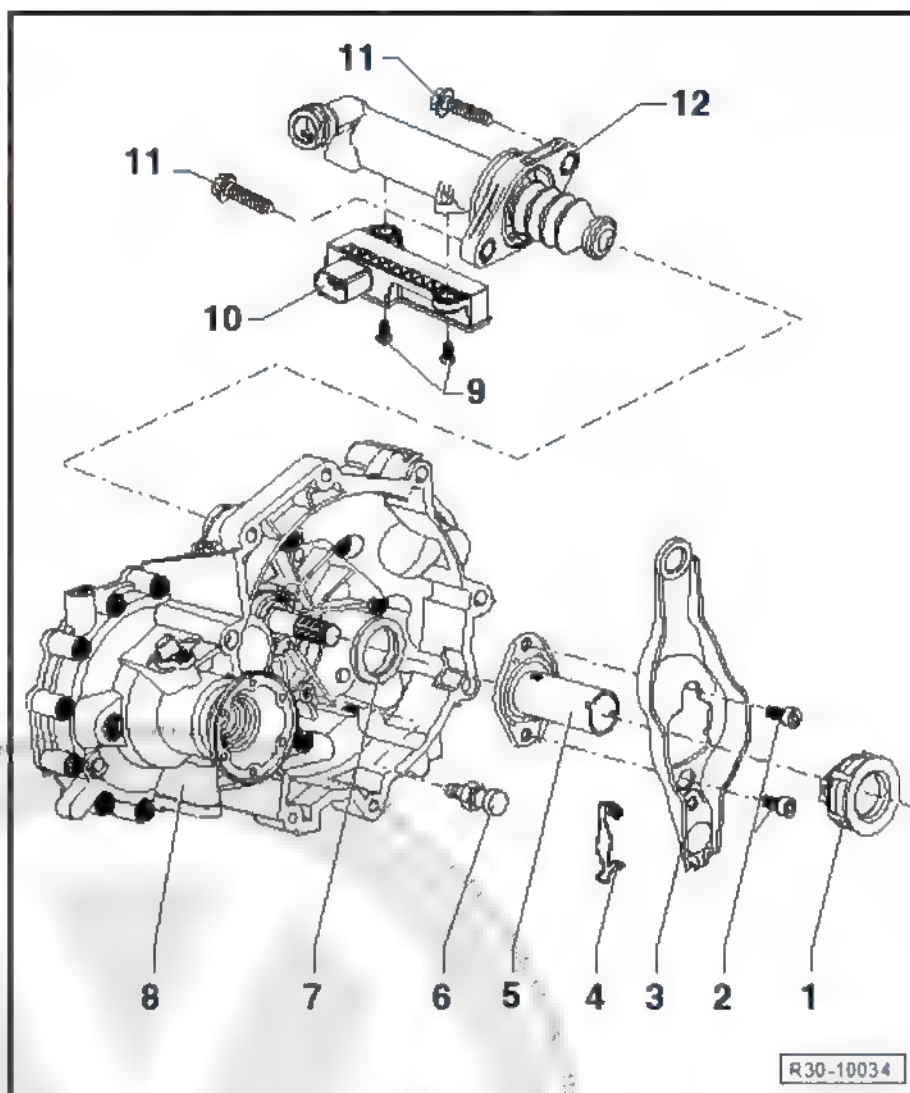
#### 7 - Sealing ring for input shaft

- ☐ Replace ➔ [page 95](#)

#### 8 - Gearbox

#### 9 - Bolts

- ☐ 1.3 Nm
- ☐ Carefully tighten the screws to not damage the slave cylinder thread





#### 10 - Clutch position sensor - G476-

- ❑ Assignment: ➔ Electronic Parts Catalogue "ETKA" .
- ❑ Apply Nyogel - G 052 817 A1- to the contact pins.

#### 11 - Bolts

- ❑ 20 Nm

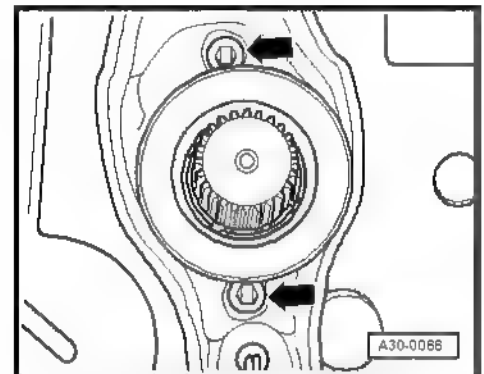
#### 12 - Hydraulic clutch slave cylinder

- ❑ Assignment: ➔ Electronic Parts Catalogue "ETKA" .
- ❑ Remove and install ➔ [page 11](#) .

#### Removing and installing the clutch lever with the clutch bearing and bearing guide

- Release the fastening screws -arrows-.
- Separate clutch lever, with the clutch lining and guide bushing, from input shaft and ball-head pin.

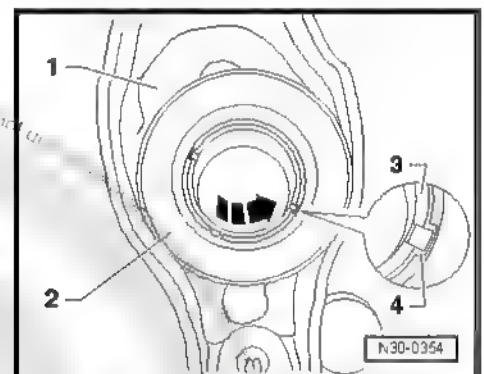
Installation is performed in reverse to removal sequence.



#### Removing and installing the bearing's guide bushing

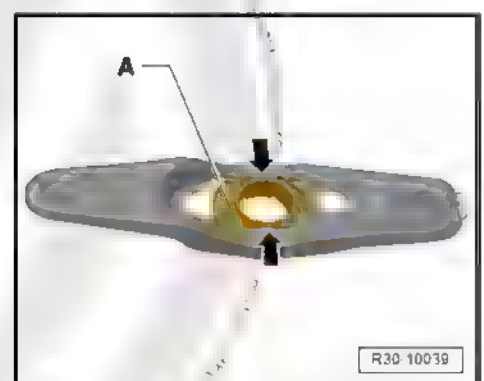
- Displace the guide bushing -3- from the clutch lining -2- by pushing it upwards.
- While securing the collar -2-, turn guide bushing -3- 90° towards arrow, until its fitting edges match the slots -4- on the collar.
- Remove guide bushing from collar.

Installation is performed in reverse to removal sequence.



#### Removing and installing clutch lining

- Compress the fitting edges -arrows- located on the rear part of the clutch lever, and pull collar -A- out of the lever.
- To install collar -A-, engage it on the clutch lever until fitting the edges -arrows- .





## 3 Clutch

⇒ "3.1 Clutch - assembly overview", page 16

⇒ "3.2 Clutch - repair", page 17

### 3.1 Clutch - assembly overview



#### Note

- ◆ Change clutch discs and plates with damaged or loosened riveted unions.
- ◆ The clutch disc and plate must correspond each other according to the ⇒ Electronic Part Catalogue "ETKA" and the engine prefixes.

#### 1 - Flywheel

- ❑ Pay attention to the perfect fitting of the guide pins.
- ❑ The contact surface of the clutch disc should be free of oil and grease, and should not have grooves.
- ❑ Remove and install ⇒ Engine; Rep. gr. 13 ; Crankshaft, pistons .

#### 2 - Clutch plate

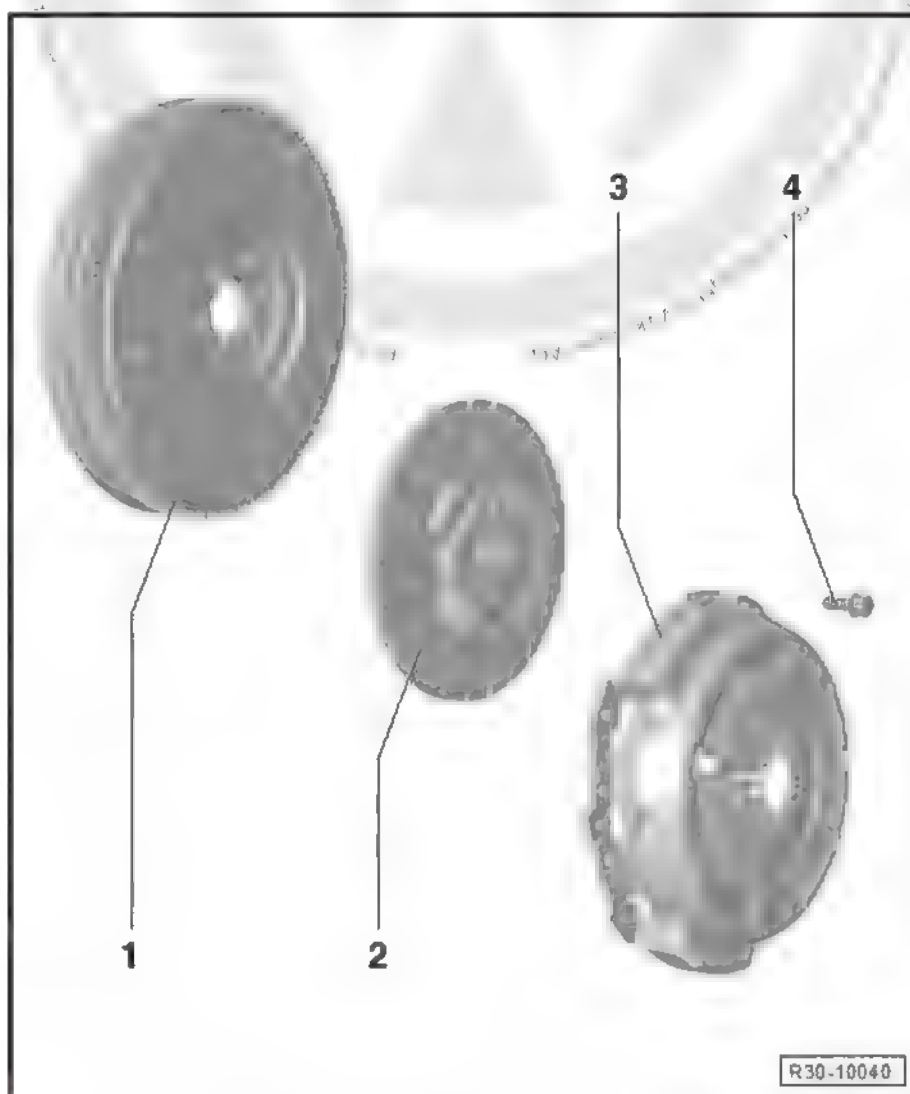
- ❑ Installation position: the spring case should be facing the clutch plate.
- ❑ Centre ⇒ page 18
- ❑ Apply a slight coat of grease on the splines.
- ❑ Clean the splines on the input shaft and the clutch plate hub used.
- ❑ Eliminate corrosion and apply a very thin coat of grease - G 000 100- on the input shaft splines. Move the clutch plate on the input shaft to one side and other until the hub slides smoothly on the shaft. Eliminate excess grease

#### 3 - Clutch plate

- ❑ Remove and install ⇒ page 18
- ❑ Check membrane spring height ⇒ page 18
- ❑ The clutch plates are greased and protected against corrosion. Clean the contact surface only, otherwise, the clutch lifetime will be significantly reduced

#### 4 - Bolt

- ❑ 20 Nm



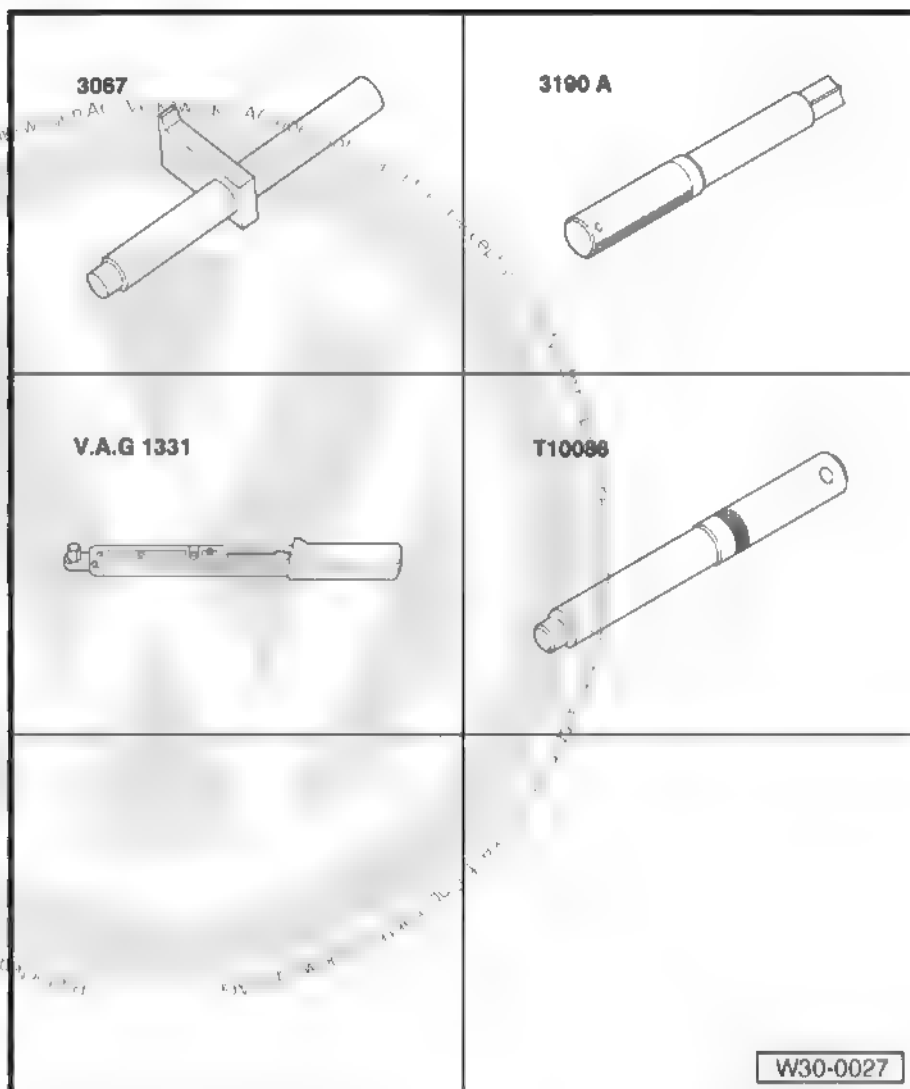




- ❑ Loosen and tighten in a cross and phased pattern

## 3.2 Clutch - repair

Special tools and workshop equipment required



- ◆ Lock - 3067-
- ◆ Guide Pin or VW 3190A - 3190A-
- ◆ Torque wrench - 5 to 50 Nm ( 1/2" drive) - VAG 1331-
- ◆ Guide pin - T10086-



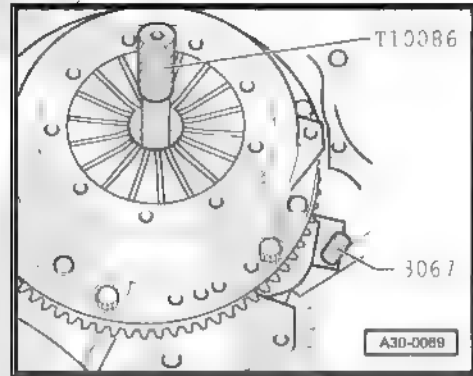
Centre the clutch disc using the Guide Pin - T10086- and remove and install the clutch plate

- Loosen and tighten screws in a cross and phased pattern.
- To remove, install Lock - 3067- .



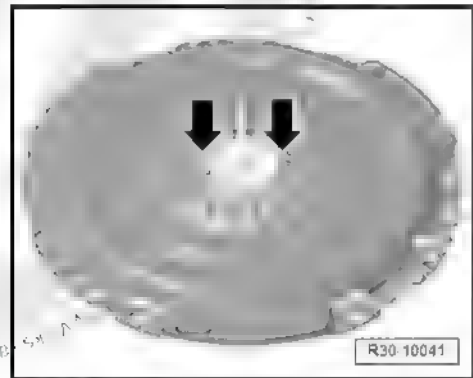
#### Note

- ◆ The clutch plate and clutch plate contact surfaces must be completely seated on the engine's flywheel.
- ◆ Tighten evenly the fastening screws, in a cross pattern, to prevent damages on the membrane spring of the clutch plate and the guide pins of the engine's flywheel.

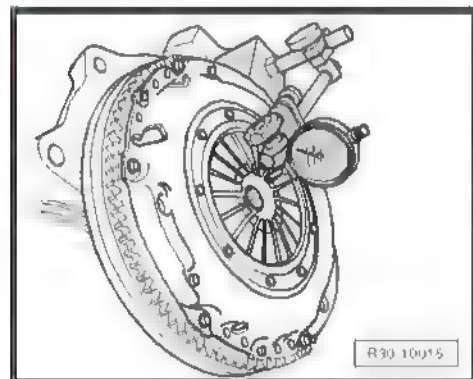


#### Measuring the height of the membrane spring

- Install the clutch [Item 3 \(page 16\)](#) .



- Fasten centesimal dial gauge support somewhere on the cylinder block.
- Reset centesimal dial gauge to zero in one of the clutch plate membrane spring tabs.
- Measure height of each tab and write down the values.
- Consider the highest and lowest values found.
- The sum of obtained values on the right and left of the zero point at the centesimal dial gauge should not be higher than 0.80 mm. Otherwise, replace it.





## 34 – Controls, housing

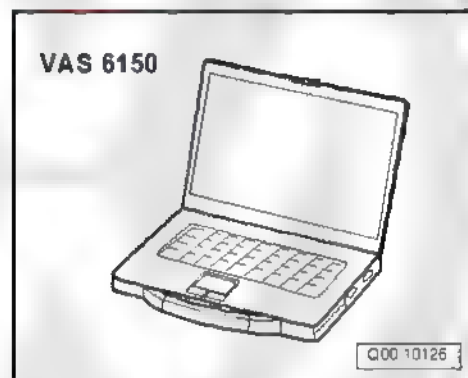
### 1 Vehicle diagnostic and service information system

➤ "1.1 Diagnosis, measurement and information system - connect", page 19

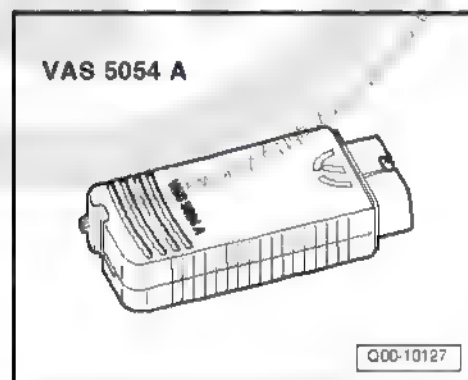
#### 1.1 Diagnosis, measurement and information system - connect

Special tools and workshop equipment required

◆ "Startline" vehicular diagnostics laptop - VAS 6150B-



◆ Wireless diagnostic connector - VAS 5054 A-



- Operate the handbrake.
- Position the gear lever in "N".
- Turn vehicle on.
- Connect Diagnosis, measurement and information system or later equipment ⇒ General Information; Rep. gr. 97 ; Electric cables and harnesses .
- Continue by selecting the desired functions ⇒ Vehicle diagnostic tester.





## 2 Electronic components and installation locations

⇒ ["2.1 Electric and electronic components - overview", page 20](#)

⇒ ["2.2 "Tiptronic" upshift switch on the steering wheel E438 and/or "Tiptronic" downshift switch on the steering wheel E439", page 22](#)

⇒ ["2.3 Sensor 2 for gear detection G616", page 22](#)

⇒ ["2.4 Gearbox input speed sender G182", page 23](#)

⇒ ["2.5 Gear detection sensor G604", page 24](#)

⇒ ["2.6 Diagnosis socket", page 26](#)

⇒ ["2.7 Selector lever position display Y6", page 26](#)

⇒ ["2.8 Automatic gearbox control unit J217", page 26](#)

### 2.1 Electric and electronic components - overview

#### 1 - Steering wheel

- ❑ Locate, remove and install "Tiptronic" upshift switch on the steering wheel - E438- and/or "Tiptronic" downshift switch on the steering wheel - E439-  
⇒ [page 22](#) .
- ❑ Check with the Vehicle diagnostic, testing and information system  
⇒ Vehicle diagnostic tester.

#### 2 - Gear identification sensor 2 - G616-

- ❑ Locate, remove and install ⇒ [page 23](#) .
- ❑ Check with the Vehicle diagnostic, testing and information system  
⇒ Vehicle diagnostic tester.

#### 3 - Engine control unit - J623-

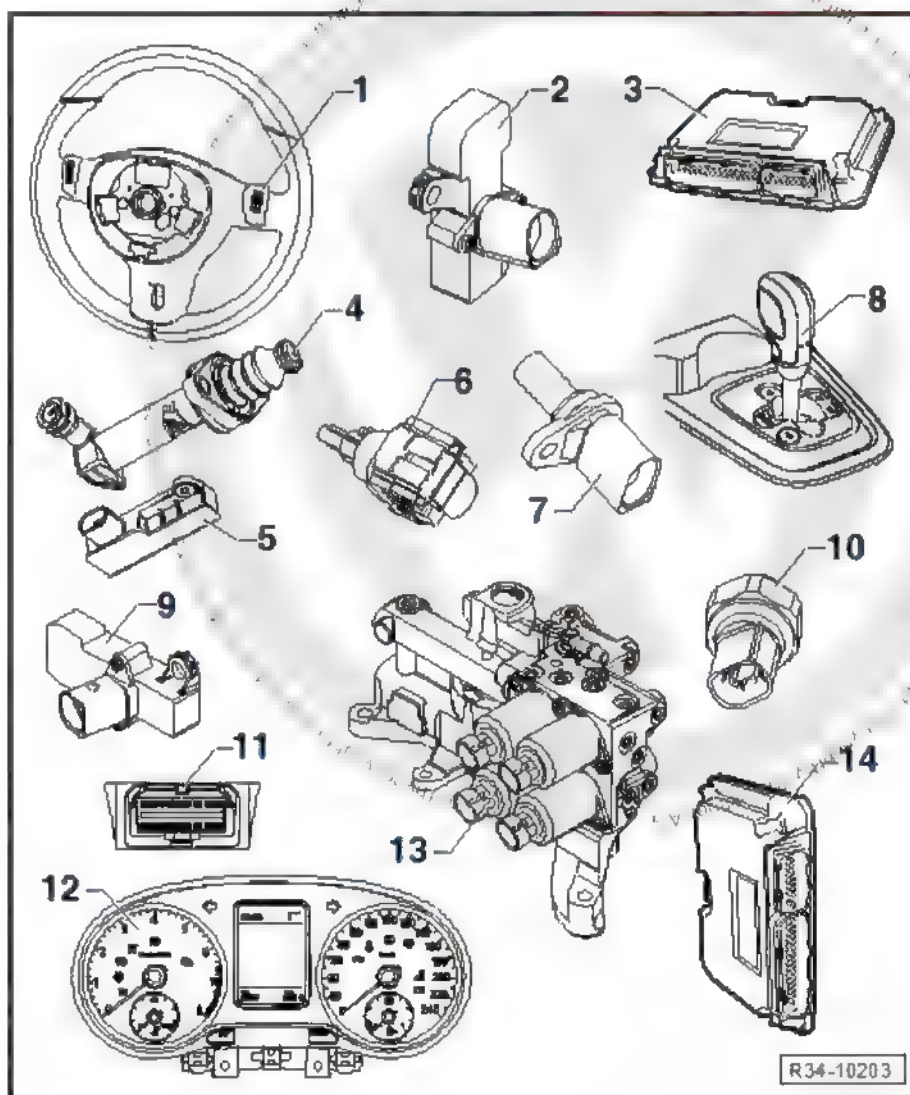
- ❑ Locating, removing and installing ⇒ Engine; Rep. gr. 24 ; Supply system - fuel injection .
- ❑ Check with the Vehicle diagnostic, testing and information system  
⇒ Vehicle diagnostic tester.

#### 4 - Hydraulic clutch slave cylinder

- ❑ Remove and install  
⇒ [page 11](#) .

#### 5 - Clutch position sensor - G476-

- ❑ Assembly overview ⇒ [page 14](#) .





- ☐ Assignment: ➔ Electronic Parts Catalogue "ETKA".
- ☐ Apply Nyogel - G 052 817 A1- to the contact pins.

#### 6 - Brake light switch - F-

- ☐ Remove and install ➔ Brake system; Rep. gr. 46 ; Brakes - Mechanical systems
- ☐ Check with the Vehicle diagnostic, testing and information system ➔ Vehicle diagnostic tester.

#### 7 - Gearbox input speed sensor - G182-

- ☐ Locate, remove and install ➔ [page 23](#) .
- ☐ Check with the Vehicle diagnostic, testing and information system ➔ Vehicle diagnostic tester.

#### 8 - Selector lever

- ☐ The Gear indications on the selector lever - Y5- is integrated in the upper central console cover.
- ☐ The Selector lever sensor control unit - J587- is incorporated in the selector lever.
- ☐ Remove and install ➔ [page 28](#) .
- ☐ Check with the Vehicle diagnostic, testing and information system ➔ Vehicle diagnostic tester.

#### 9 - Gear identification sensor - G604-

- ☐ Locate, remove and install ➔ [page 24](#) .
- ☐ Check with the Vehicle diagnostic, testing and information system ➔ Vehicle diagnostic tester.

#### 10 - Gearbox hydraulic pressure sensor - G270-

- ☐ Remove and install ➔ [page 54](#) .
- ☐ Check with the Vehicle diagnostic, testing and information system ➔ Vehicle diagnostic tester.

#### 11 - Diagnosis socket

- ☐ Location ➔ [page 26](#)

#### 12 - Selected gear indicator - Y6-

- ☐ Location ➔ [page 26](#)
- ☐ Remove and install ➔ Electric equipment; Rep. gr. 90 ; Instrument case, displays
- ☐ Check with the Vehicle diagnostic, testing and information system ➔ Vehicle diagnostic tester.

#### 13 - Electro-valves set

The valve set has the following components:

- ◆ Clutch actuator valve - N255- "EV0".
- ◆ Valve 1 for gear selection - N284- "EV1".
- ◆ Valve 2 for gear selection - N285- "EV2".
- ◆ Valve 3 for gear selection - N286- "EV3".
- ☐ Remove and install ➔ [page 49](#) .
- ☐ Check with the Vehicle diagnostic, testing and information system ➔ Vehicle diagnostic tester.

#### 14 - Automatic gearbox control unit - J217-

- ☐ Locate, remove and install ➔ [page 26](#) .
- ☐ Check with the Vehicle diagnostic, testing and information system ➔ Vehicle diagnostic tester.



## 2.2 "Tiptronic" upshift switch on the steering wheel - E438- and/or "Tiptronic" downshift switch on the steering wheel - E439-

"Tiptronic" upshift switch on the steering wheel - E438- and/or  
"Tiptronic" downshift switch on the steering wheel - E439-

Location: located on the steering wheel -arrows-.

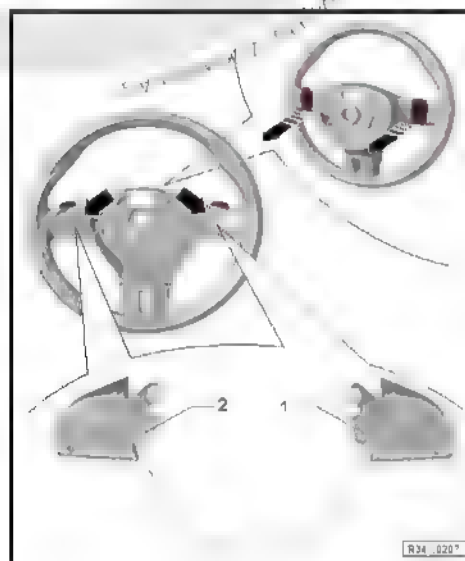
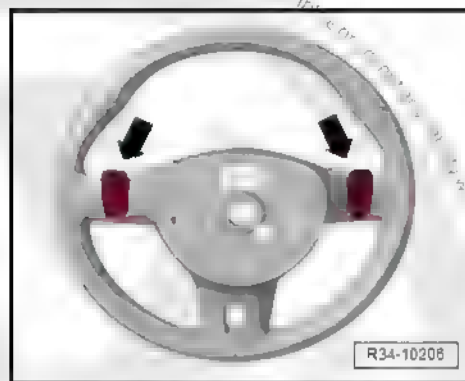
Removal:

- Turn off the ignition, all electrical devices, and remove the ignition key.
- Disconnect the Battery - A- ➔ Electrical equipment; Rep. gr. 27 ; Starter, alternator, battery .
- Remove the Driver side airbag igniter - N95- ➔ Body - Internal assembly works; Rep. gr. 69 ; Passenger protection or remove the Horn Actuator - H- ➔ Chassis, axles, steering; Rep. gr. 48 ; Steering .
- Remove the command key from the multifunction steering wheel ➔ Communication; Rep. gr. 91 ; Radio, telephone, navigation system .
- Disconnect the connectors -1- and -2-.
- Remove the fastening screws -arrows- and remove the "Tiptronic" upshift switch on the steering wheel - E438- and/or "Tiptronic" downshift switch on the steering wheel - E439- in the direction of movement -arrows-.

Installation:

Installation is performed in reverse to removal sequence, considering the following:

- After installation, perform self-diagnostic ➔ Vehicle diagnostic tester.



## 2.3 Sensor 2 for gear detection - G616-



### WARNING

- ◆ When handling chemicals follow the safety instructions ➔ Chemical Products Manual; Rep. gr. 00
- ◆ Assignment of Chemical Materials ➔ Electronic Parts Catalogue "ETKA"





## Sensor 2 for gear detection - G616-

Location: located in the gear selection mechanism "Actuator Pack" -1-.

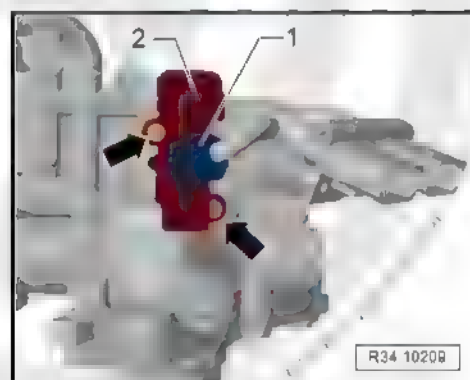
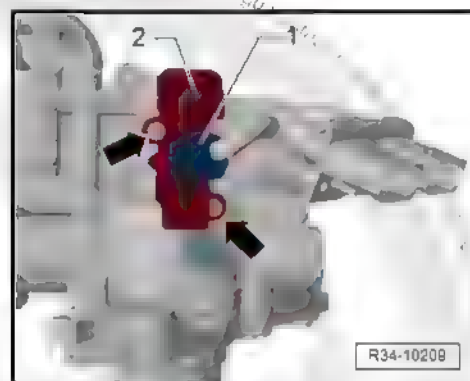
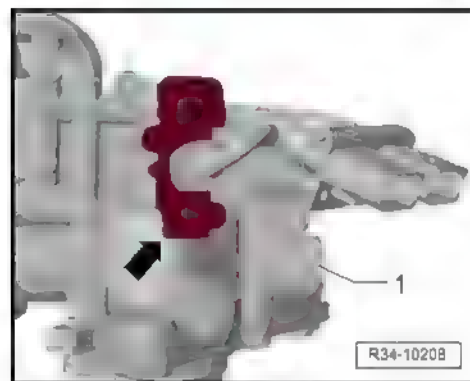
### Removal:

- Turn off the ignition, all electrical devices, and remove the ignition key.
- Disconnect and remove the Battery - A- ➔ Electrical equipment; Rep. gr. 27 ; Starter, alternator, battery .
- Remove the air filter behind the Battery - A- ➔ Engine; Rep. gr. 24 ; Fuel supply - injection system .
- Remove the console from the Battery - A- ➔ Electrical equipment; Rep. gr. 27 ; Starter, alternator, battery .
- Disconnect connector -1-.
- Remove the fastening screws -arrows- and remove the Gear identification sensor 2 - G616- -2-.

### Installation:

Installation is performed in reverse to removal sequence, considering the following:

- Tighten fastening screws -arrows- to  $(3.6 \pm 0.6 \text{ Nm})$ .
- Apply Nyogel - G 052 817 A1- to the contact pins.
- After installation, perform self-diagnostic and basic adjustments ➔ Vehicle diagnostic tester



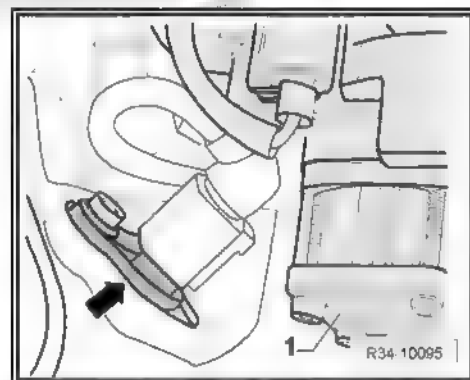
## 2.4 Gearbox input speed sender - G182-

### Gearbox input speed sender - G182-

Location: installed at the gearbox case -arrow-, next the covers for the gearbox and the Hydraulic gearbox pump - V387- -1-.

### Removal:

- Turn off the ignition, all electrical devices, and remove the ignition key.
- Disconnect the Battery - A- ➔ Electrical equipment; Rep. gr. 27 ; Starter, alternator, battery .
- Remove the air filter behind the Battery - A- ➔ Engine; Rep. gr. 24 ; Fuel supply - injection system .
- Remove the fastening screws (3 units) ➔ [Item 1 \(page 36\)](#) , for the hydraulic set "Power Pack" ➔ [Item 4 \(page 10\)](#) .
- Lift the vehicle ➔ Maintenance ; Booklet 22.1 ; Service descriptions, vehicle lifting .



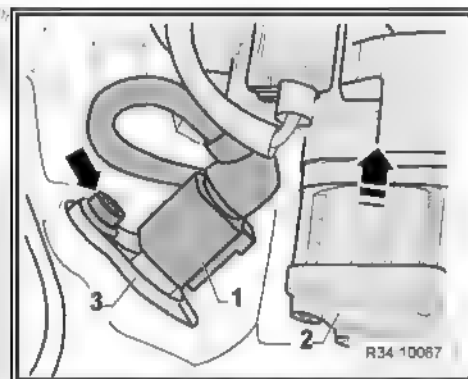
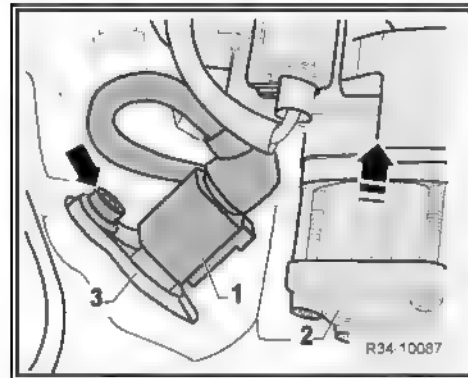


- Disconnect the connector -1- from the Gearbox rotation sensor - G182- -3-. To facilitate operation, use the Hook - T10118- and at the same time, slightly move the hydraulic set "Power Pack" -2- upwards.
- Remove the securing bolt -arrow-.
- Remove the Gearbox rotation sensor - G182- -3-.

Installation:

Installation is performed in reverse to removal sequence, considering the following:

- Replace the sealing ring (O-ring) of the Transmission input speed sensor - G182- ➔ [Item 23 \(page 94\)](#) .
- Replace the fastening screws.
- Install the new fastening screw -arrow- for the Gearbox rotation sensor - G182- -3-. See tightening torque ➔ [Item 22 \(page 94\)](#) .
- Install new fastening screws from the hydraulic set "Power Pack". Tightening torque, see ➔ [Item 1 \(page 36\)](#) .
- Lower the vehicle.
- After installation, perform self-diagnostic and basic adjustments ➔ Vehicle diagnostic tester.



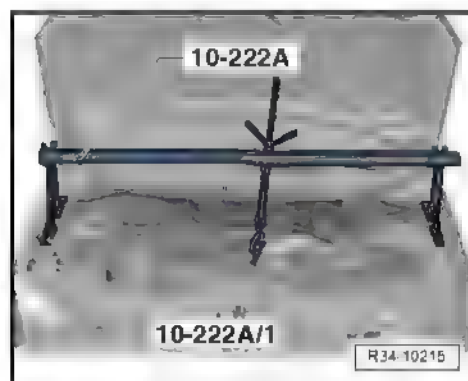
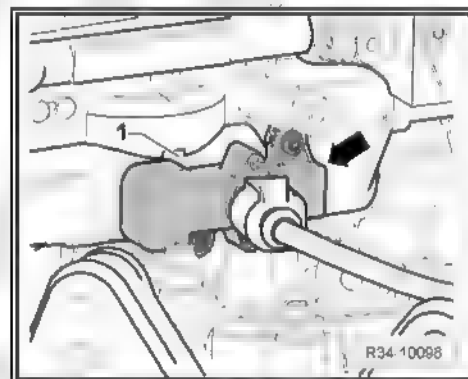
## 2.5 Gear detection sensor - G604-

Gear detection sensor - G604-

Location: located in the gear selection mechanism "Actuator Pack".

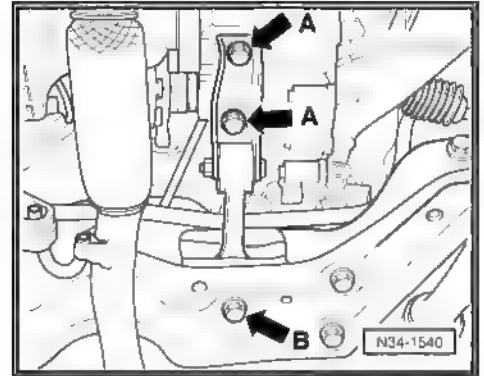
Removal:

- Turn off the ignition, all electrical devices, and remove the ignition key.
- Disconnect and remove the Battery - A- ➔ Electrical equipment; Rep. gr. 27 ; Starter, alternator, battery .
- Remove the air filter behind the Battery - A- ➔ Engine; Rep. gr. 24 ; Fuel supply - Injection system .
- Remove the console from the Battery - A- ➔ Electrical equipment; Rep. gr. 27 ; Starter, alternator, battery .
- Install Bracket or VW 061 - 10-222A- with Support - 10-222 A/1- and sustain slightly the engine/gearbox.
- Relieve the engine/gearbox assembly weight through the fuse.
- Lift the vehicle.

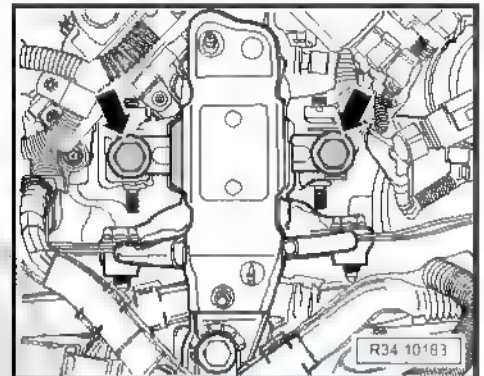




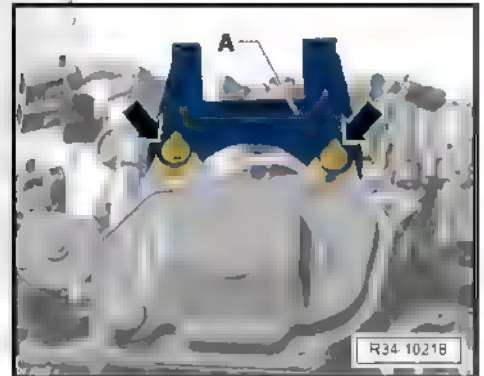
- Remove the fastening screws -arrows A- and -arrows B- of the pendulum support.
- Remove the pendulum support.
- Remove the left front wheel.
- Remove noise insulation and the left front wheel case cover  
⇒ General body repairs, exterior; Rep. gr. 66 ; External equipment .
- Lower the vehicle.



- Remove the fastening screws -arrows- on the gearbox support.
- Carefully tilt the engine/gearbox assembly. To do that, turn the screw of the Bracket or VW 061 - 10-222A- approximately 35 mm downwards.
- Lift the vehicle.



Remove the fastening screws -arrows- and remove the console -A-.



- Disconnect connector -1-.
- Remove the fastening screws -arrows- and remove the Gear identification sensor - G604- -2-.

Installation:

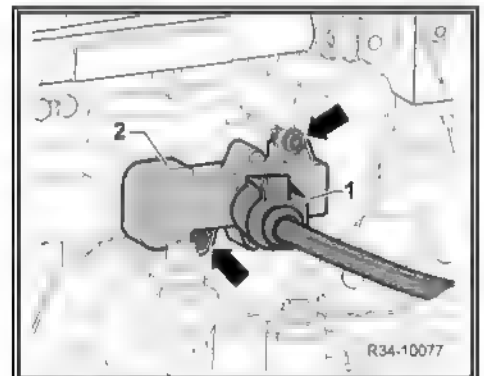
Installation is performed in reverse to removal sequence, considering the following:



#### WARNING

*Replace self-locking nuts and screws subject to angular torque.*

- ◆ *When handling chemicals follow the safety instructions ⇒ Chemical Products Manual; Rep. gr. 00*
- ◆ *Assignment of Chemical Materials ⇒ Electronic Parts Catalogue "ETKA"*

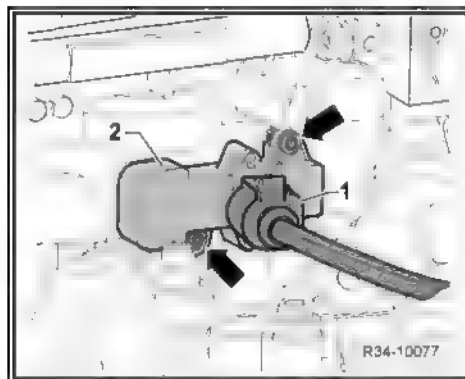




- Install and tighten fastening screws -arrows- to  $(3.6 \pm 0.6 \text{ Nm})$ .

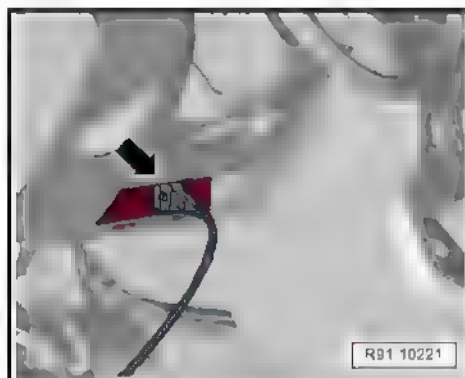
Consult tightening torques for fastening the gearbox in  
⇒ [page 71](#) .

- Apply Nyogel - G 052 817 A1- to the contact pins.
- After installation, perform self-diagnostic and basic adjustments ⇒ Vehicle diagnostic tester



## 2.6 Diagnosis socket

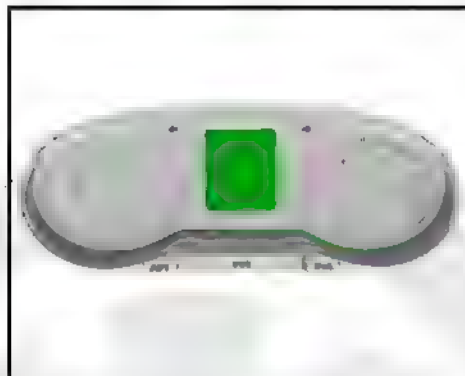
Diagnosis socket



## 2.7 Selector lever position display - Y6-

Selector lever position display - Y6-

Location: in the dash panel insert - K-



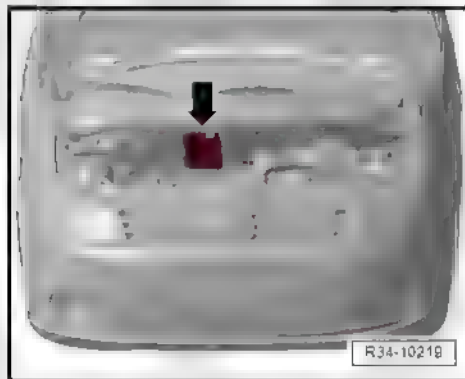
## 2.8 Automatic gearbox control unit - J217-

Automatic gearbox control unit - J217-

Location: found on the engine compartment partition panel-arrow-.

Removal:

- Switch the ignition off.



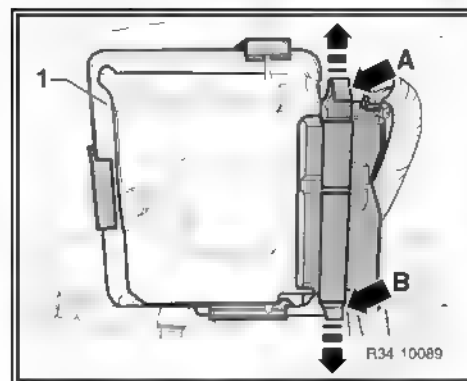


- Pull the locks -arrow A- and -arrow B- in the direction of the -arrows- and disconnect the multiple connectors from the Automatic gearbox control unit - J217- -1-.
- Remove the Automatic gearbox control unit - J217- -1- from the fastening support.

**Installation:**

Installation is performed in reverse to removal sequence, considering the following:

- After installation, perform self-diagnostic and basic adjustments ⇒ Vehicle diagnostic tester





### 3 Selector lever

➔ "3.1 Selector lever - assembly overview", page 28

➔ "3.2 Selector lever handle - remove and install", page 29

➔ "3.3 Upper selector lever cover - remove and install",  
page 30

➔ "3.4 Selector lever - remove and install", page 31

➔ "3.5 Lower selector lever cover - remove and install",  
page 32

➔ "3.6 Selection lever boot - adjust", page 33

➔ "3.7 Selector lever operation - check", page 34

#### 3.1 Selector lever - assembly overview

##### 1 - Selector lever handle

- ❑ Remove and install  
⇒ [page 29](#) .

##### 2 - Upper cover

- ❑ Remove and install  
⇒ [page 30](#) .
- ❑ The Gear indications on the selector lever - Y5- is integrated in the upper cover.

##### 3 - Bolt

- ❑ 1.5 Nm.

##### 4 - Centre console (upper)

- ❑ Remove and install ⇒  
Body - interior assembly  
work; Rep. gr. 68 ; In-  
ternal equipment .

##### 5 - Bolts

- ❑ 1.5 Nm.

##### 6 - Centre console (lower)

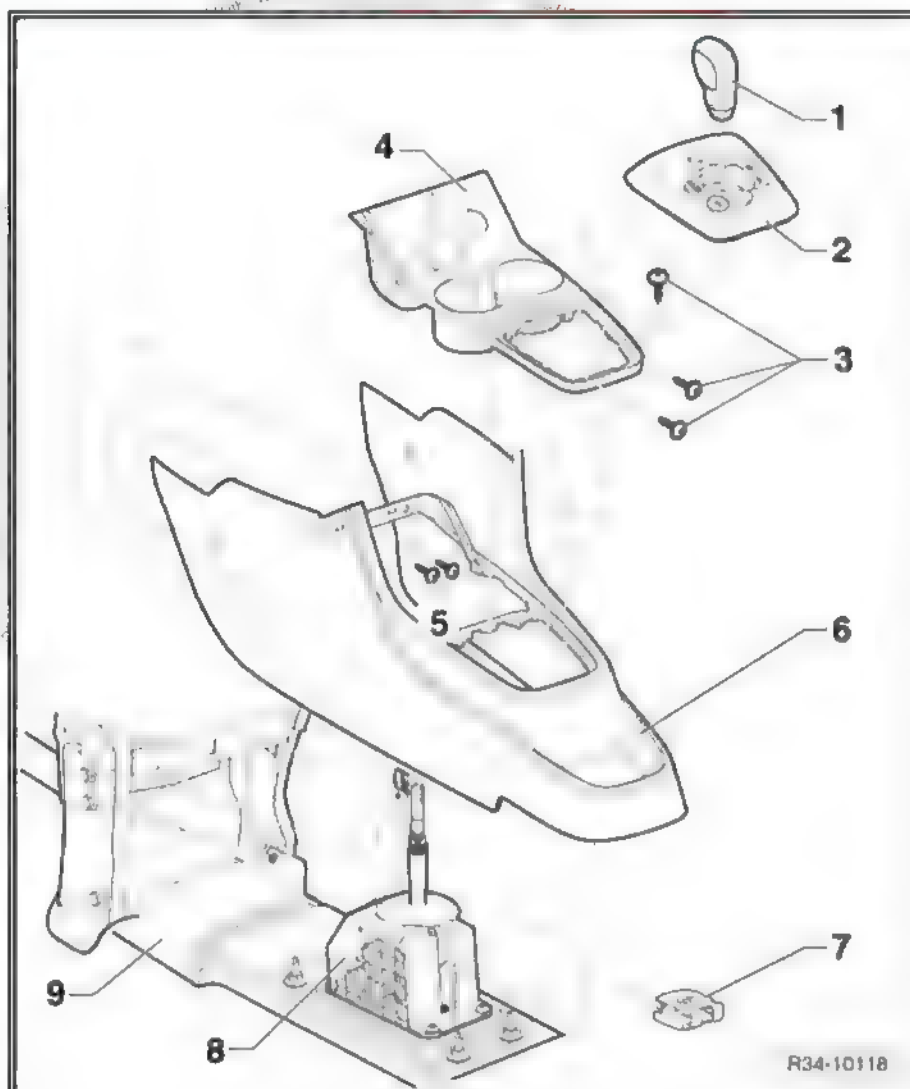
- ❑ Remove and install ⇒  
Body - interior assembly  
work; Rep. gr. 68 ; In-  
ternal equipment .

##### 7 - Clip nut

##### 8 - Selector lever

- ❑ Remove and install  
⇒ [page 31](#)
- ❑ Check with the Vehicle  
diagnostic, testing and  
information system  
⇒ Vehicle diagnostic  
tester.
- ❑ Check the operating positions ➔ [page 34](#)

##### 9 - Body







1 - Selection lever boot

- ☐ Adjust the boot  
→ [page 33](#)

2 - Bolts

- ☐ 8 Nm

3 - Hexagonal nuts

- ☐ 4 units
- ☐ 8 Nm

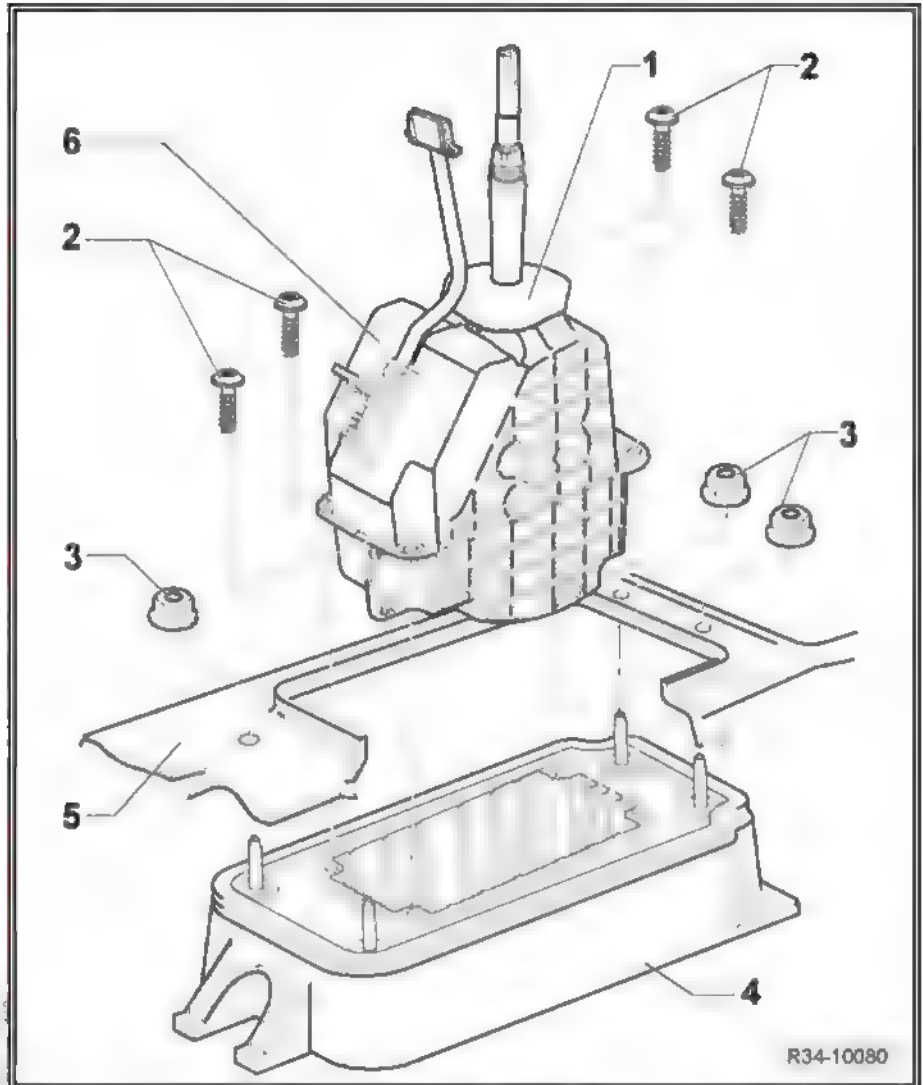
4 - Lower selector lever cover

- ☐ Remove and install  
⇒ [page 32](#)

5 - Body

6 - Selector lever

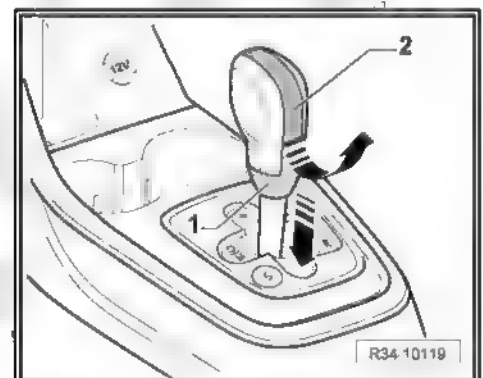
- ☐ Remove and install  
⇒ [page 31](#)
- ☐ Check with the Vehicle diagnostic, testing and information system  
⇒ Vehicle diagnostic tester.
- ☐ Check the operating positions ⇒ [page 34](#)



## 3.2 Selector lever handle - remove and install

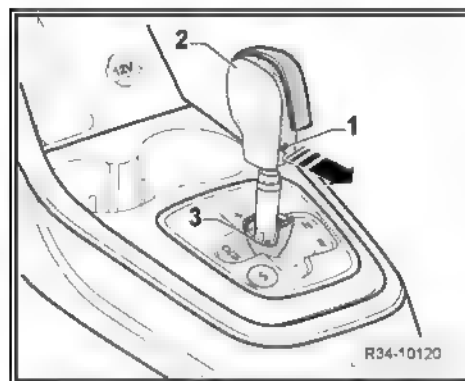
### 3.2.1 Removal

- Detach the lower cover -1- in the direction of the -arrow- and then the upper cover -2- in the direction of the -arrow-.





- Release the lock -1- in the direction of the -arrow-.
- Remove the selector lever handle -2- then the lower cover -3-.



### 3.2.2 Installation

Installation is performed in reverse to removal sequence, considering the following:



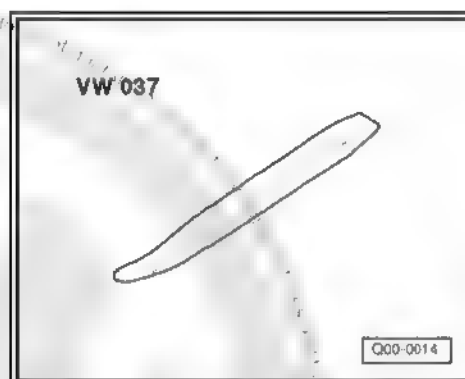
#### Note

After installation, check the operating positions of the selector lever ⇒ [page 34](#) .

### 3.3 Upper selector lever cover - remove and install

Special tools and workshop equipment required

- ◆ Spatula - VW 037-



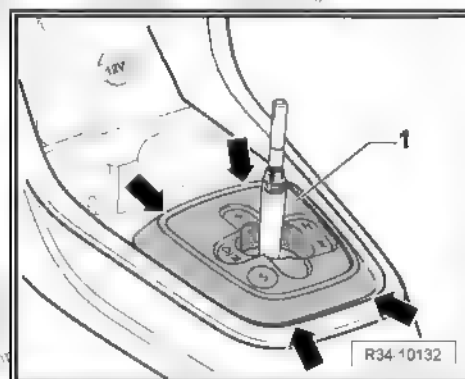
#### 3.3.1 Removal

- Remove the selector lever handle ⇒ [page 29](#) .
- Use the Spatula -VW 037- and detach the upper cover -1- at the fastening points -arrows-.



#### Note

Carefully remove in order not to damage the upper cover or the lower console.



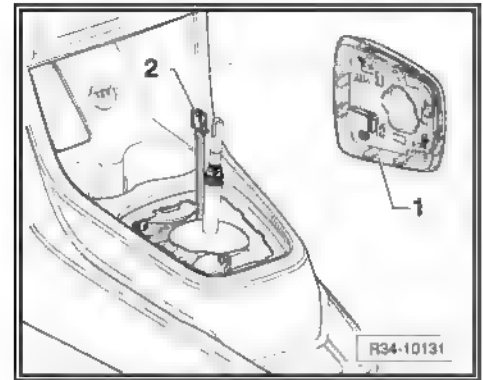


- Disconnect the connector -2- from the upper cover -1-.



#### Note

The Gear indications on the selector lever - Y5- is integrated in the upper cover.



### 3.3.2 Installation

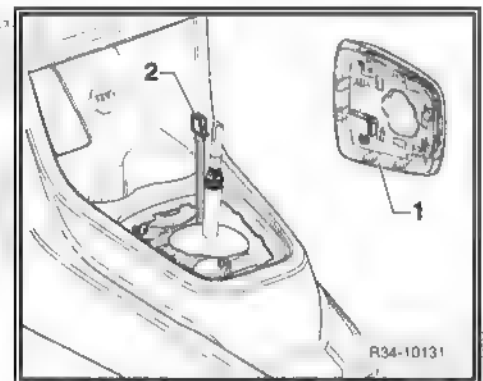
Installation is performed in reverse to removal sequence, considering the following:

- Connect the connector -2- to the upper cover -1- and position the harness from the right side, as indicated.
- Adjust the selector level boot ⇒ [page 33](#) .



#### Note

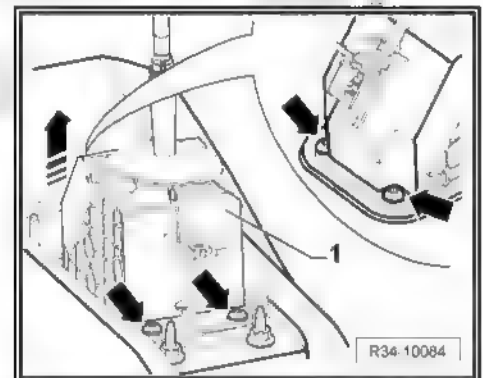
After installation, check the operating positions of the selector lever ⇒ [page 34](#) .



### 3.4 Selector lever - remove and install

#### 3.4.1 Removal

- Remove the selector lever handle ⇒ [page 29](#) .
- Remove the upper selector lever cover ⇒ [page 30](#) .
- Remove the centre console ⇒ Body & Internal assembly work; Rep. gr. 68 ; Internal equipment .
- Disconnect the connector from selector lever.
- Release the fastening screws -arrows-.
- Carefully detach and remove the selector lever in the direction of the -arrow-.



#### 3.4.2 Installation

Installation is performed in reverse to removal sequence, considering the following:



- Install the selector lever and tighten the fastening screws with a torque of ➤ [Item 2 \(page 29\)](#) .
- Install the centre console ➤ [General body repairs, interior; Rep. gr. 68 ; Internal equipment](#) .
- Install the upper selector lever cover ➤ [page 30](#) .
- Adjust the selector level boot ➤ [page 33](#) .



#### Note

After installation, check the operating positions of the selector lever ➤ [page 34](#) .

## 3.5 Lower selector lever cover - remove and install

### 3.5.1 Removal

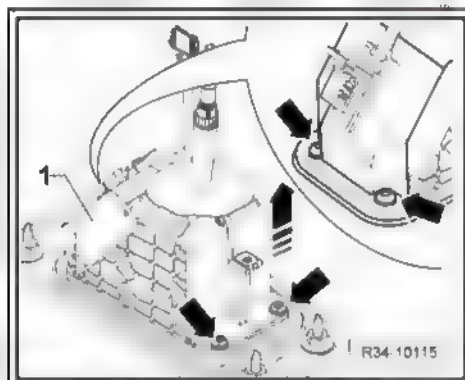
- Remove the selector lever handle ➤ [page 29](#) .
- Remove the upper selector lever cover ➤ [page 30](#) .
- Remove the centre console ➤ [Body - Internal assembly work; Rep. gr. 68 ; Internal equipment](#) .
- Disconnect the connector from selector lever.
- Loosen the fastening screws -arrows- for the selector lever.
- Carefully detach and remove the selector lever -1- in the direction of the -arrow-.
- Lift the vehicle.
- Remove the lower floor linings ➤ [General body repairs, exterior; Rep. gr. 66 ; External equipment](#) .
- Separate the front exhaust pipe from the rear exhaust pipe, by loosening the double clamp and the sustaining strap ➤ [Engine; Rep. gr. 26 ; Exhaust system](#) .



#### Note

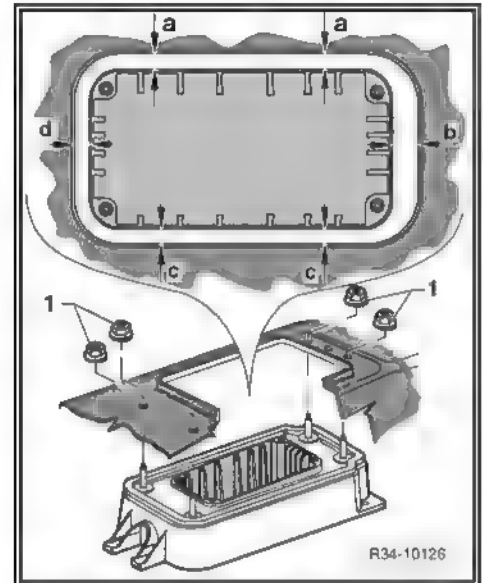
Fastening nuts and screws of the front exhaust pipe near the exhaust manifold/catalytic converter, must not be loosened

- Remove the heat shield ➤ [Engine; Rep. gr. 26 ; Exhaust system](#)
- Lower the vehicle.





- Inside the vehicle, measure and record position -a, b, c, d- measurements for the lower selector lever cover in relation to the vehicle's floor.
- Loosen the fastening nuts -1- and remove the lower selector lever cover from underneath the vehicle



### 3.5.2 Installation

Installation is performed in reverse to removal sequence, considering the following:

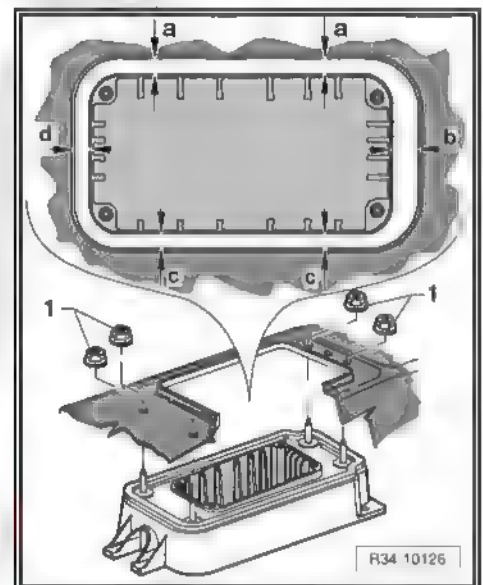
Position the lower cover according to measurements -a, b, c, d- recorded during removal.

- Tighten the fastening nuts -1- for the lower cover with a torque of [⇒ Item 3 \(page 29\)](#).
- Install selector lever [⇒ page 31](#).
- Install the centre console [⇒ General body repairs, interior; Rep. gr. 68 ; Internal equipment](#).
- Install the upper selector lever cover [⇒ page 30](#).
- Adjust the selector level boot [⇒ page 33](#).



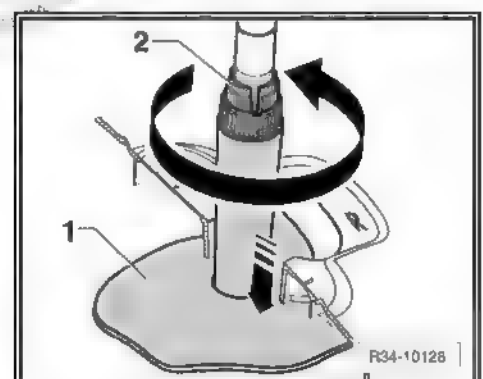
#### Note

After installation, check the operating positions of the selector lever [⇒ page 34](#).



### 3.6 Selection lever boot - adjust

- Remove the selector lever handle [⇒ page 29](#).
- Loosen the adjustment ring -2- in the direction of the arrow -arrow-.
- Move the boot -1- in the direction of the -arrow-.





- Adjust boot -1- in the direction of the -arrow-, until it measures -a- 22.5 mm.



Note

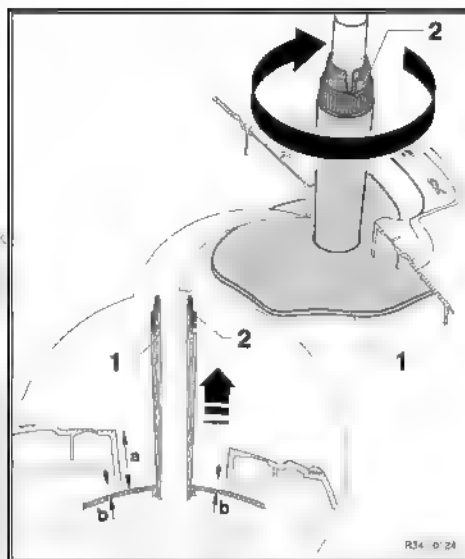
Measurement -b- represents the gap between the boot and the upper cover which should be 2 mm.

- Lock the adjustment ring -2- in the direction of the arrow -arrow-



Note

After installation, check the operating positions of the selector lever ➔ [page 34](#) .



### 3.7 Selector lever operation - check

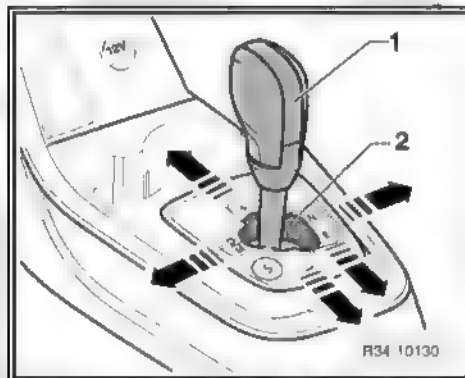
#### Selection lever positions

Move the selector lever -1- to all its positions -arrows- and identify:

"D/M and N" check the gaps between the lever and the wall of the upper cover -2-

"+" and "-" check the gaps between the lever and the wall of the upper cover -2-

"R" check the gaps between the lever and the wall of the upper cover -2-



#### WARNING

These gaps should be divided, otherwise it is necessary to adjust the gap between the selector lever and the upper cover, loosening the lower cover screws ➔ [page 33](#) .

It is important to maintain the alignment between the lower and upper covers to avoid interference or friction with the selector lever.





## 4 Gear selection mechanism - adjust

→ ["4.1 Gear selection mechanism - assembly overview", page 35](#)

→ ["4.2 Gear selection mechanism - remove and install", page 37](#)

→ ["4.3 Gear selection mechanism - components", page 45](#)

→ ["4.4 Gear selection mechanism - repair", page 48](#)

### 4.1 Gear selection mechanism - assembly overview



#### WARNING

- ◆ *When handling chemicals follow the safety instructions → Chemical Products Manual; Rep. gr. 00*
- ◆ *Assignment of Chemical Materials → Electronic Parts Catalogue "ETKA"*



#### Note

*To remove the gear selection mechanism, the transmission should be removed.*



1 - Bolts

- ☐ 6 units
- ☐ 25 Nm + 45°.
- ☐ Replace after each removal.

2 - Gear selection mechanism  
- adjust

- ☐ During removal, the selector shaft must not be separated  
⇒ [Item 6 \(page 36\)](#) .
- ☐ Remove and install  
⇒ [page 37](#) .
- ☐ Disassemble and assemble ⇒ [page 48](#) .

3 - Bolts

- ☐ 3 units.
- ☐ 8.5 ± 0.1 Nm
- ☐ Fastening for the selector axle set.

4 - Sealing ring (O-ring)

- ☐ Always replace when removed.
- ☐ See: ⇒ Electronic Parts Catalogue "ETKA".
- ☐ Apply a thin coat of Pol-yurea grease - G 052 142 A2 ⇒ [page 37](#) .

5 - Centralizing bushing

6 - Selector axle set

- ☐ During removal, the selector mechanism must not be separated  
⇒ [Item 2 \(page 36\)](#) .
- ☐ Remove only from the gear selection mechanism in case any component from the set needs to be repaired
- ☐ Clean sealing surfaces before installation.
- ☐ Apply Sealing compound - AMV 188 200 03- evenly on the sealing surface.

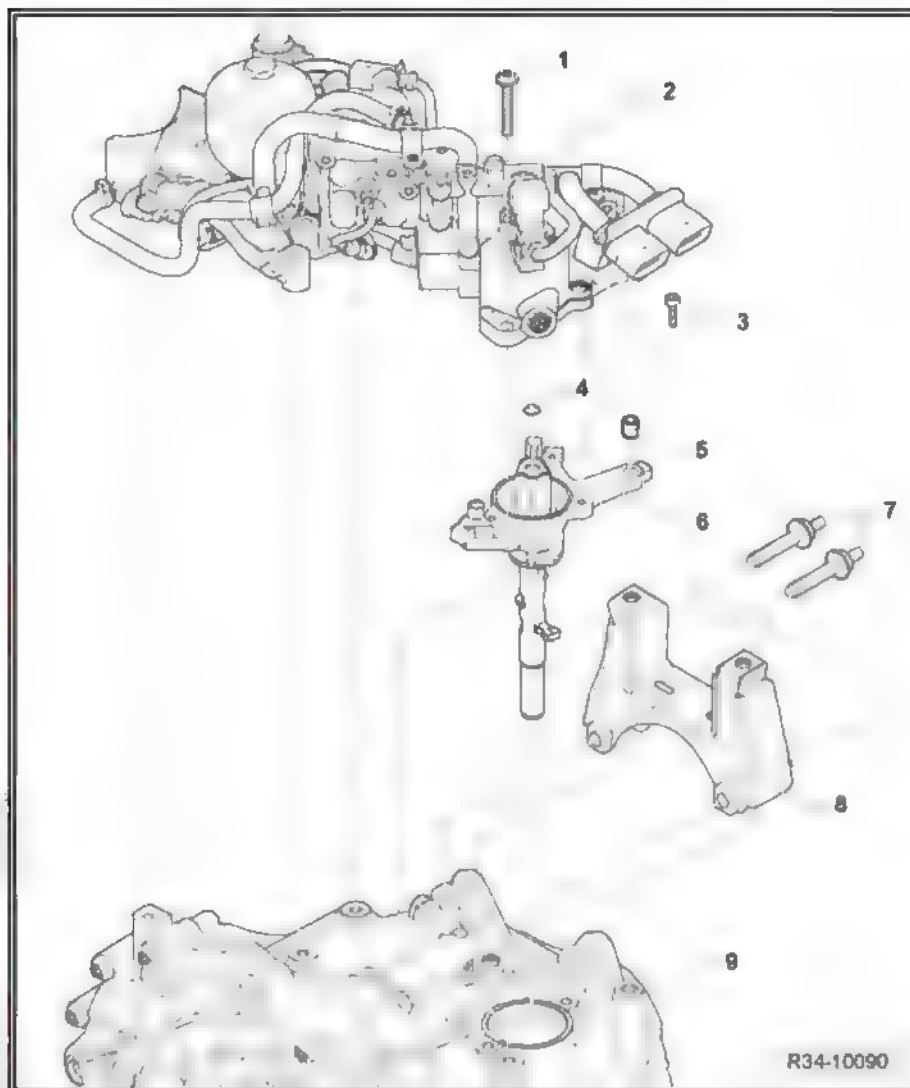
7 - Bolts

- ☐ 40 Nm + 90°.
- ☐ Replace after each removal.

8 - Console

9 - Gearbox.

- ☐ In the removal, it should be removed along with the gear selection mechanism
- ☐ Remove and install ⇒ [page 61](#) .





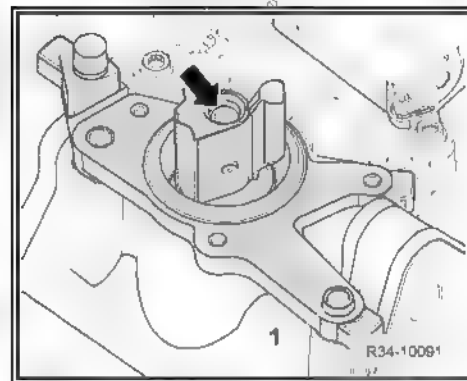
## Replace the sealing ring

- When installing, apply a thin coat of Polyurea grease - G 052 142 A2- on the sealing ring (O-ring) -arrow-.

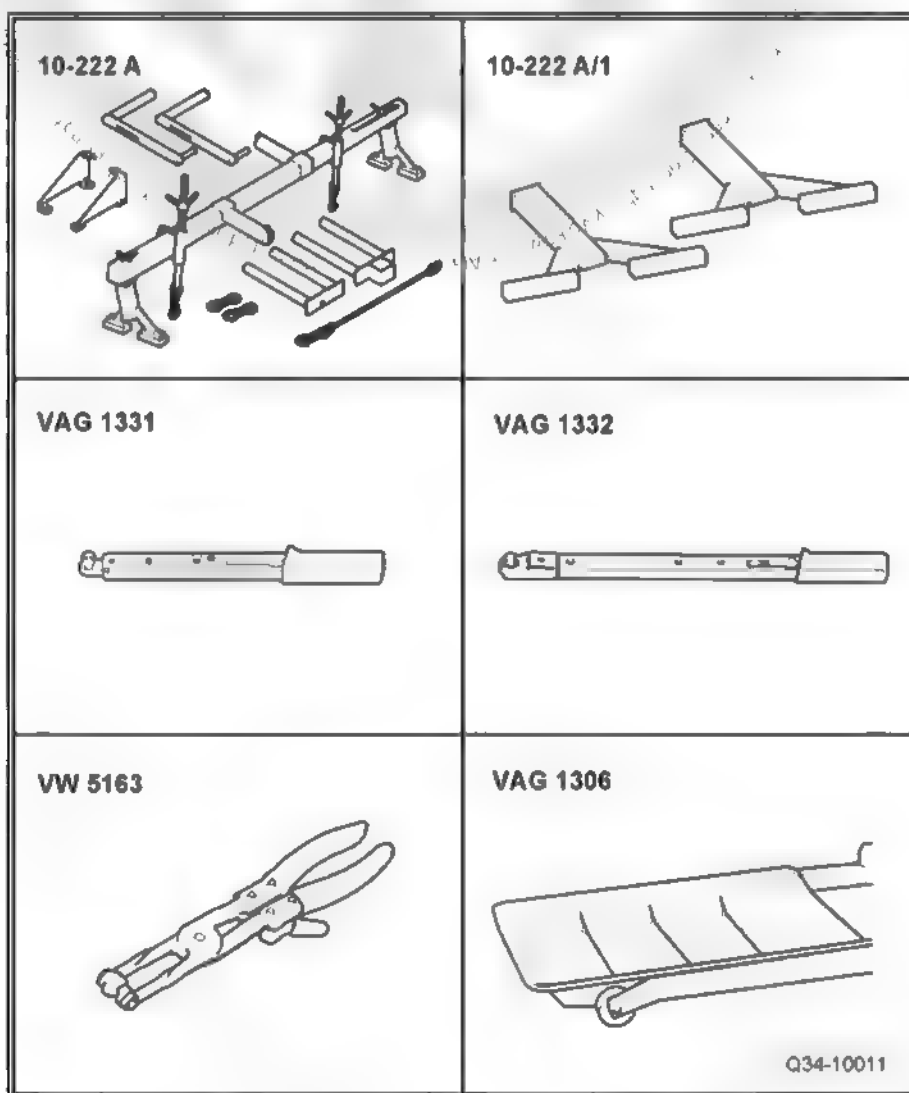


### Note

Position the bushing -1- so that in the installation the set (gear selection mechanism / selector shaft / transmission) is aligned



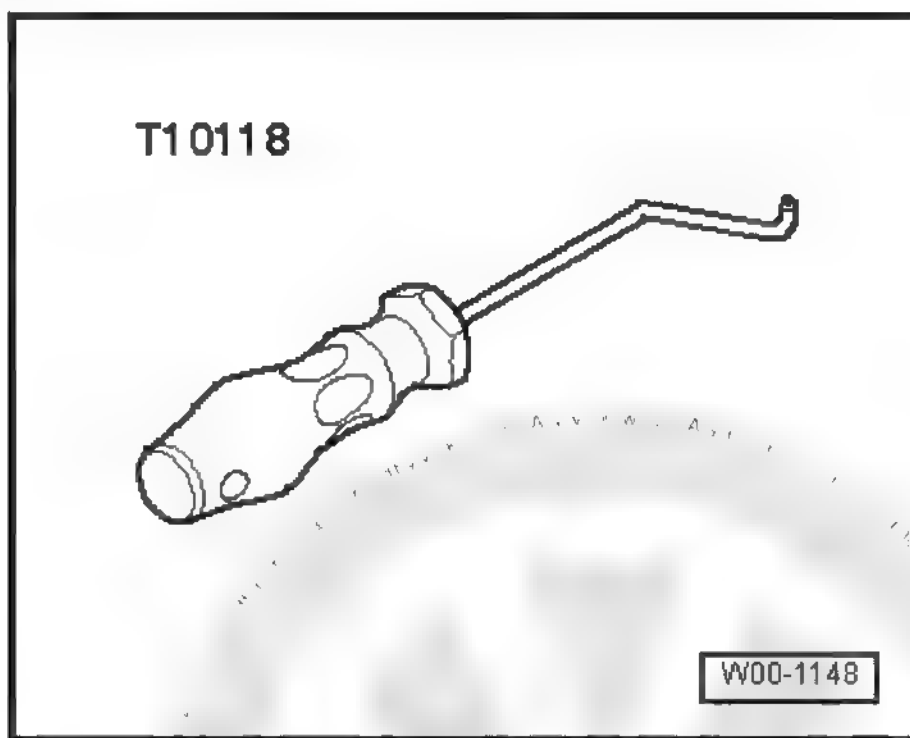
## 4.2 Gear selection mechanism - remove and install



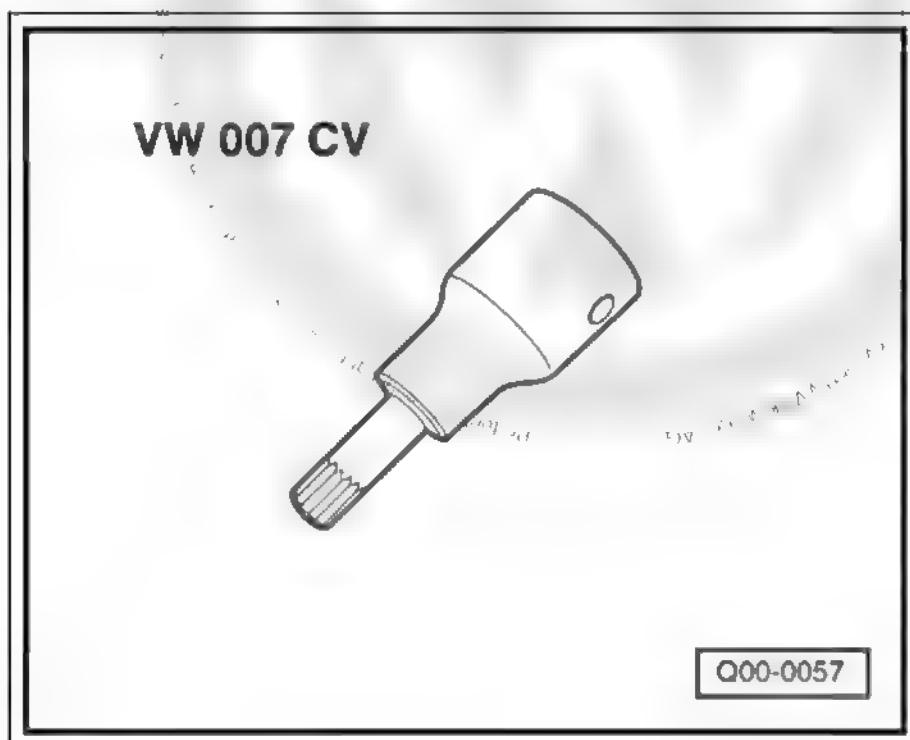
- ◆ Support or VW 061 - 10-222A-
- ◆ Support - 10-222 A/1-
- ◆ Torque wrench - 5 to 50 Nm ( 1/2" drive) - VAG 1331-
- ◆ Torque Wrench - 40 to 200 Nm (fit. 1/2" drive) - VAG 1332-
- ◆ Pliers for Space-Saver clamps - VW 5163-



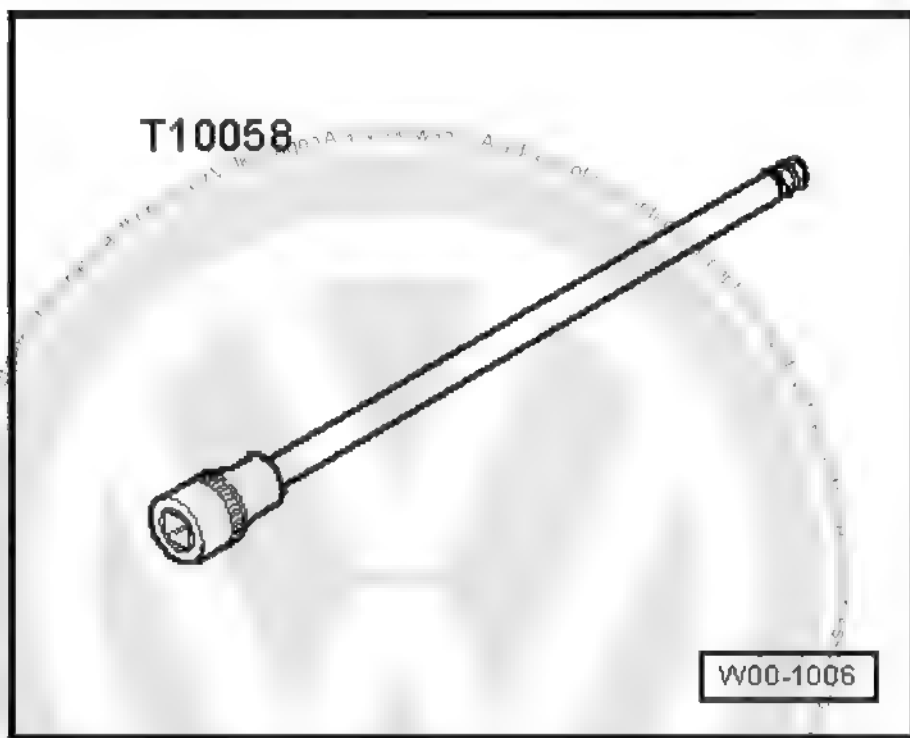
- ◆ Oil collecting tray - VAG 1306-



- ◆ Hook - T10118-



- ◆ Multi-tooth M8 socket (1/2" drive) - VW 007CV-



- ◆ Special long socket - T10058

#### 4.2.1 Removal



##### WARNING

*Before performing works in the hydraulic system you should:*

- ◆ Consult the fault memory.
- ◆ Relieve the pressure from the hydraulic system (depressurizing).

In order to consult the fault memory, it is necessary to use the Diagnosis, Measurement and Information System .

- Connect the Battery charger ⇒ General information; Rep. gr. 27 ; Battery - charge .
- Connect the Diagnosis, Measurement and Information System ⇒ [page 19](#) .
- Turn on the Vehicle diagnostic, testing and information system and select the operation mode Assisted troubleshooting and then the following menu functions:

In order to perform depressurization of the hydraulic system, it is necessary to use the Vehicle diagnostic, testing and information system .

- Operate the handbrake.
- Place the selector lever in position "N".
- Turn vehicle on.
- Connect the Diagnosis, Measurement and Information System ⇒ [page 19](#) .



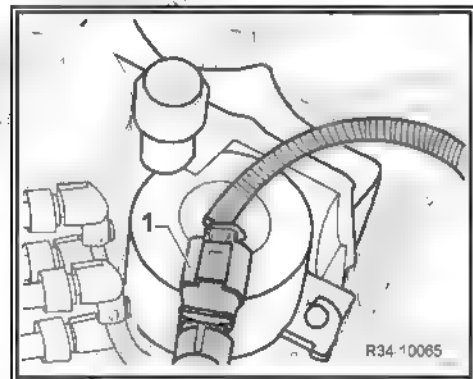
- Turn on the Vehicle diagnostic, testing and information system and select the operation mode **Guided functions** and then the following menu functions
  - ◆ Select
  - ◆ **Model**
  - ◆ **Year**
  - ◆ **Body**
  - ◆ **Engine**
  - ◆ **ASG automated transmission**
  - ◆ **Relieve the hydraulic system pressure**



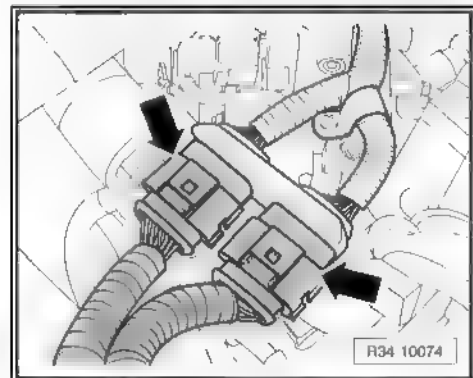
**WARNING**

*After depressurizing the hydraulic system, it is necessary to wait approximately 1 minute before turning off the ignition.*

- Disconnect the Battery - A- ⇒ Electrical equipment; Rep. gr. 27 ; Starter, alternator, battery .
- Remove the Battery - A- ⇒ Electric equipment; Rep. gr. 27 ; Starter, alternator, battery .
- Remove the air filter behind the Battery - A- ⇒ Engine; Rep. gr. 24 ; Fuel supply - injection system .
- Remove the console from the Battery - A- ⇒ Electrical equipment; Rep. gr. 27 ; Starter, alternator, battery .
- Disconnect the connector 1- supplying power to the electric motor of the Hydraulic gearbox pump - V387- .



- Disconnect the connectors -arrows-.







- Remove the connector -1-, removing it from the bracket.

Continuation:

- Remove the transmission ➔ [page 63](#) .

Continuation for vehicles with removed gearbox:

- Disconnect the connector -1- from the Clutch position sensor - G476- .

Detach the lock -arrow- and remove the high-pressure connection tube -2- from the slave cylinder -3-.

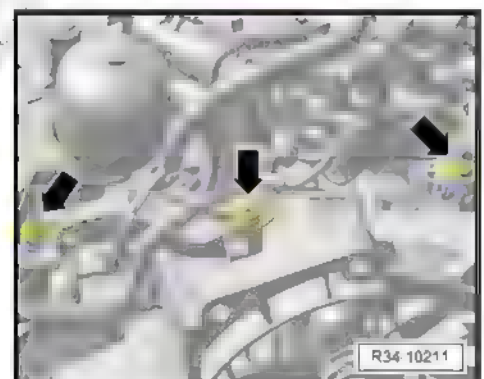
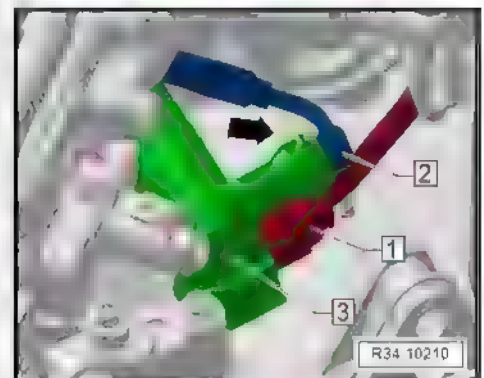
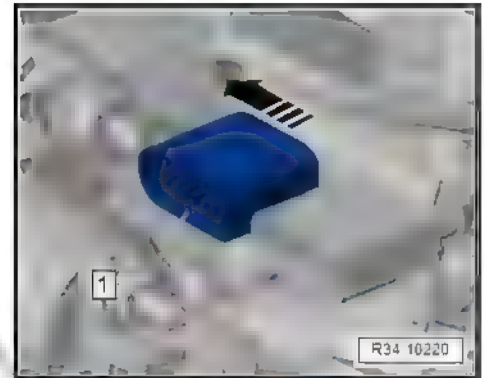


#### WARNING

- ◆ *Cleaning is necessary to avoid any contamination inside the slave cylinder or the high-pressure tube.*
- ◆ *Pay attention to the general repair instructions ➔ [page 7](#) .*

- Remove the fastening screws -arrows- from the gear selection mechanism.

- Remove the fastening screws -arrows- from the gear selection mechanism.
- Lift the vehicle.

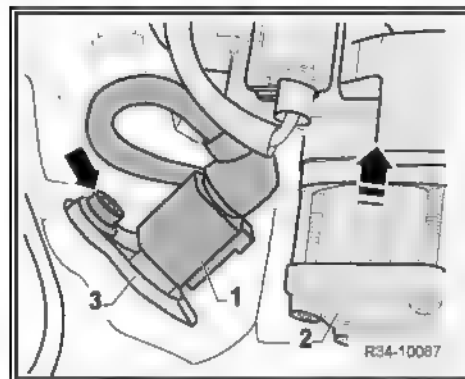




- Disconnect the connector -1- from the Gearbox rotation sensor - G182-. To facilitate operation, use the Hook - T10118- and slightly move the gear selection mechanism set -2- upwards.

- Remove the gear selection mechanism from the transmission.

If it is necessary, repair the gear selection mechanism. Consult in ➔ [page 48](#) .



## 4.2.2 Installation

Installation is performed in reverse to removal sequence, considering the following:



### WARNING

*Replace self-locking nuts and screws subject to angular torque.*

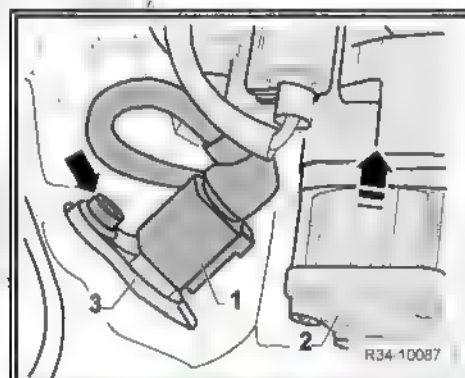
- ◆ When handling chemicals follow the safety instructions ➔ *Chemical Products Manual; Rep. gr. 00*
- ◆ Assignment of Chemical Materials ➔ *Electronic Parts Catalogue "ETKA"*

- Clean sealing surfaces before installation.
- Apply Sealing compound - AMV 188 200 03- evenly on the sealing surface of the selector axle set.
- Install the gear selection mechanism and connect the connector -1- from the Transmission input speed sensor - G182-.



### WARNING

- *Cleaning is necessary near the cylinder opening and the tube to avoid any kind of contamination (dust, etc.). Since it can damage the hydraulic system.*
- *Pay attention to the general repair instructions ➔ [page 7](#) .*



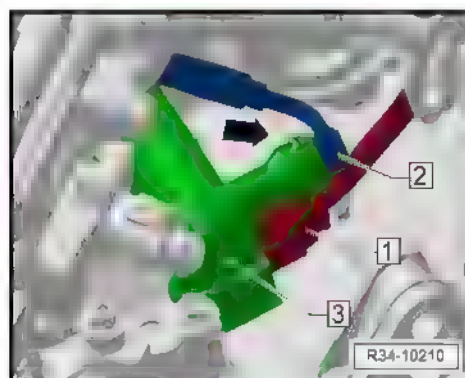
- Fit the high-pressure connection tube -2- onto the slave cylinder -3- until it clicks and attaches.



### WARNING

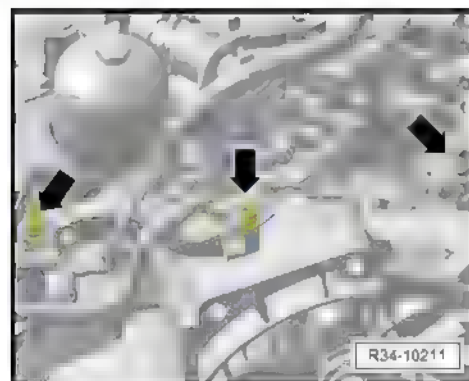
*The tubing connection -2- should be properly connected to the slave cylinder -3-. If this does not occur, hydraulic oil will leak at high-pressure.*

- Connect the connector -1- from the Clutch position sensor - G476-.





- Install and tighten the fastening screws -arrows- from the gear selection mechanism. Tightening torque, see [Item 1 \(page 36\)](#) .





- Install and tighten the fastening screws -arrows- from the gear selection mechanism. Tightening torque, see [→ Item 1 \(page 36\)](#) .
- Install transmission [→ page 61](#) .

Continuation:

- Lower the vehicle.
- Install the Battery - A- console ⇒ **Electrical equipment**; Rep. gr. 27 ; Starter, alternator, battery .
- Install the air filter behind the Battery - A- ⇒ **Engine**; Rep. gr. 24 ; Fuel supply - injection system .
- Install and connect the Battery -- ⇒ **Electrical equipment**; Rep. gr. 27 ; Starter motor, alternator, battery .



#### Note

After installation, perform self-diagnostic and basic adjustments  
⇒ *Vehicle diagnostic tester*.

#### Basic adjustments instructions sequence:

- Elevate the vehicle approximately 30 cm from the ground.
- Activate the brake pedal.
- Place the selector lever in position "N".
- Turn the vehicle on.
- Turn engine off.
- Turn vehicle on.
- Connect the Battery charger ⇒ **General information**; Rep. gr. 27 ; Battery - charge .
- Connect the Diagnosis, Measurement and Information System ⇒ [page 19](#) .
- Turn on the Vehicle diagnostic, testing and information system and select the operation mode **Guided functions** and then the following menu functions:
  - ◆ Select:
  - ◆ **Model**
  - ◆ **Year**
  - ◆ **Body**
  - ◆ **Engine**
  - ◆ **ASG automated transmission**
  - ◆ **Basic adjustment of the initial clutch position**
  - ◆ **Basic adjustment of the initial gearshift lever**



## 4.3 Gear selection mechanism - components



### WARNING

- ◆ When handling chemicals follow the safety instructions ⇒ *Chemical Products Manual; Rep. gr. 00*
- ◆ Assignment of Chemical Materials ⇒ *Electronic Parts Catalogue "ETKA"*



### Note

*It is possible to remove and install some components with the gear selection mechanism installed in the gearbox (removed from the vehicle).*

#### 1 - Pressure accumulator

- ☐ 90 ± 9 Nm.
- ☐ Replace the sealing ring (O-ring) .

#### 2 - Electric motor for the Hydraulic gearbox pump - V387-

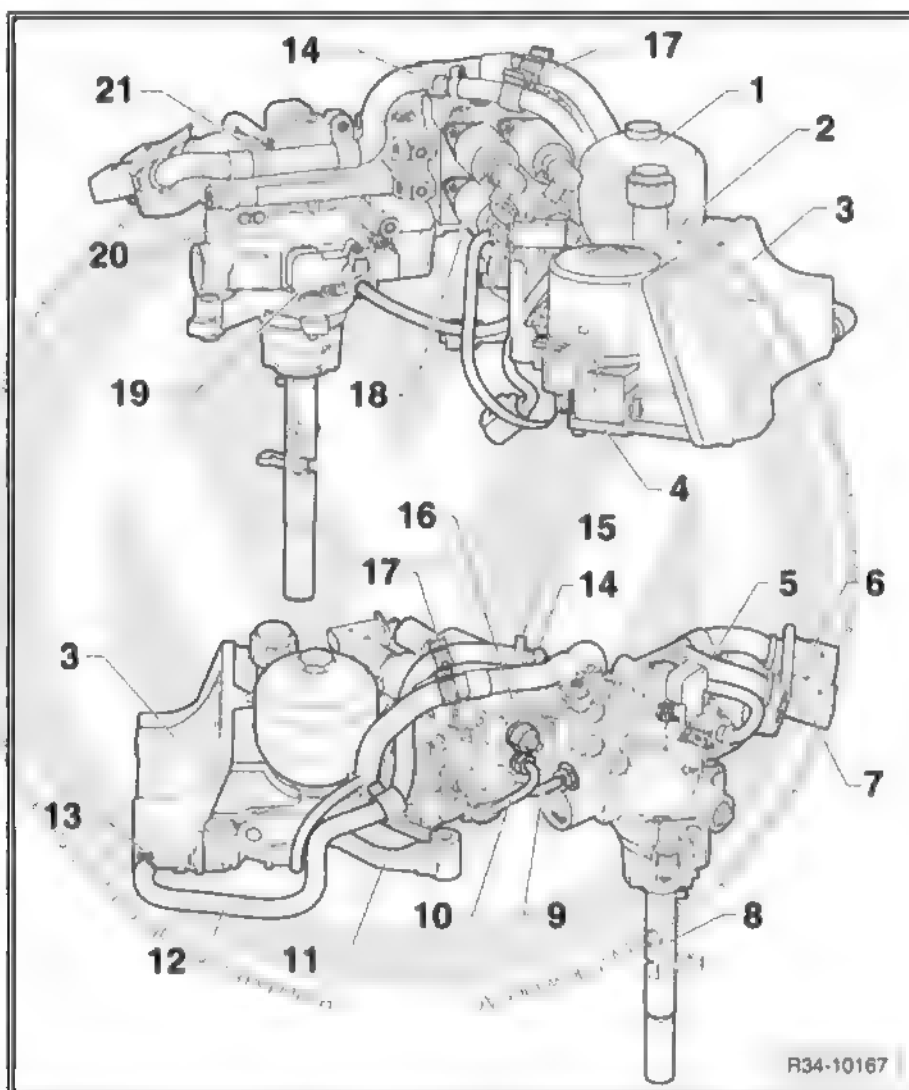
- ☐ Remove and install ⇒ [page 55](#) .
- ☐ Apply Nyogel - G 052 817 A1- to the contact pins.
- ☐ Assignment: ⇒ Electronic Parts Catalog "ETKA"
- ☐ When replacement is necessary, the entire set "Electric motor and hydraulic pump" must be replaced.

#### 3 - Hydraulic oil reservoir

- ☐ Remove and install ⇒ [page 54](#) .
- ☐ Dimensions: Oil for gear selection mechanism - G 052 512 S1- .
- ☐ Consult filling capacity ⇒ [page 1](#) .
- ☐ After replacement, check and complete the tank oil level ⇒ [page 89](#) .

#### 4 - Hydraulic gearbox pump - V387-

- ☐ Remove and install ⇒ [page 56](#) .
- ☐ Assignment: ⇒ Electronic Parts Catalog "ETKA"
- ☐ When replacement is necessary, the entire set "Electric motor and hydraulic pump" must be replaced.
- ☐ After replacement, check and complete the tank oil level ⇒ [page 89](#) .



R34-10167



**5 - Gear identification sensor 2 - G616-**

- ☐ Locate, remove and install ➔ [page 23](#) .
- ☐ Check with the Vehicle diagnostic, testing and information system ➔ Vehicle diagnostic tester.
- ☐ Apply Nyogel - G 052 817 A1- to the contact pins.

**6 - 14-pin connector - T14- "Brown"**

- ☐ Apply Nyogel - G 052 817 A1- to the contact pins.
- ☐ Pin assignment ➔ [page 47](#) .

**7 - 14-pin connector - T14- "Black"**

- ☐ Apply Nyogel - G 052 817 A1- to the contact pins.
- ☐ Pin assignment ➔ [page 47](#) .

**8 - Selector axle set**

**9 - High-pressure slave cylinder**

- ☐ Replace after every removal
- ☐ Replace ➔ [page 51](#) .
- ☐ After replacement, check and complete the tank oil level ➔ [page 89](#) .

**10 - Pressure tube**

- ☐ Replace after every removal
- ☐ Replace ➔ [page 52](#) .
- ☐ After replacement, check and complete the tank oil level ➔ [page 89](#) .

**11 - Hydraulic set**

- ☐ "Power Pack"
- ☐ Remove and install ➔ [page 35](#) .

**12 - Return pipe**

- ☐ Replace ➔ [page 57](#) .
- ☐ After replacement, check and complete the tank oil level ➔ [page 89](#) .
- ☐ Handle with care!

**13 - Clamp**

- ☐ For the reservoir side.
- ☐ Replace after every removal

**14 - Oil return connector**

- ☐ Handle with care!

**15 - Clamp**

- ☐ For the actuator side.

**16 - Maximum pressure valve**

- ☐ Replace after every removal
- ☐ Replace ➔ [page 53](#) .
- ☐ After replacement, check and complete the tank oil level ➔ [page 89](#) .

**17 - Clamp**

**18 - Valve set (electronic valves)**

- ☐ Remove and install ➔ [page 49](#) .
- ☐ After installation, check and complete the tank oil level ➔ [page 89](#) .

**19 - Gear identification sensor - G604-**

- ☐ Locate, remove and install ➔ [page 24](#) .
- ☐ Check with the Vehicle diagnostic, testing and information system ➔ Vehicle diagnostic tester.
- ☐ Apply Nyogel - G 052 817 A1- to the contact pins.





## 20 - Gear selection mechanism - adjust

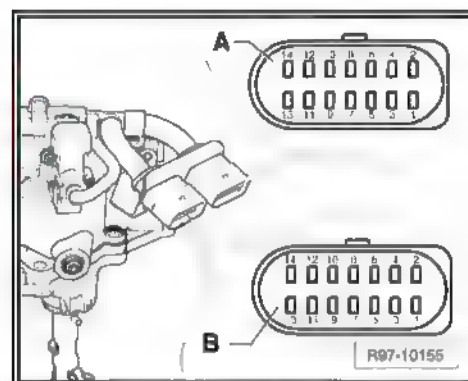
- ☐ Remove and install ➔ [page 35](#) .

## 21 - Wiring harness / connectors bracket

- ☐ Wiring harness - remove and install ➔ [page 58](#) .
- ☐ Connector bracket - remove and install ➔ [page 59](#) .

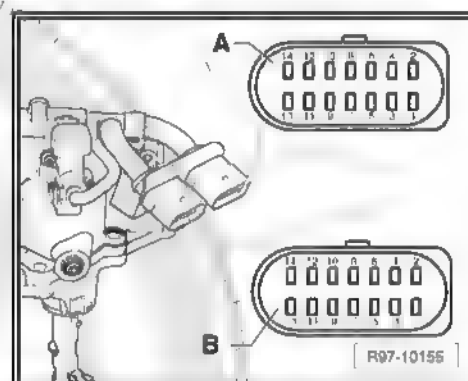
### Multiple connector A assignment, 14-pin connector - T14- "Brown"

- 1 - Gearbox speed sensor - G182- - 1
- 2 - Gearbox speed sensor - G182- - 2
- 3 - Gear identification sensor 2 - G616- - 2
- 4 - Gear identification sensor 2 - G616- - 4
- 5 - Gear identification sensor 2 - G616- - 3
- 6 - Gear identification sensor 2 - G616- - 1
- 7 - Gear identification sensor - G604- - 2
- 8 - Gear identification sensor - G604- - 4
- 9 - Gear identification sensor - G604- - 3
- 10 - Gear identification sensor - G604- - 1
- 11 - Power supply (5V)
- 12 - Sensor ground wire (-)
- 13 - Gearbox hydraulic pressure sensor - G270-
- 14 - Clutch position sensor - G476-



### Multiple connector B assignment, 14-pin connector - T14- "Black"

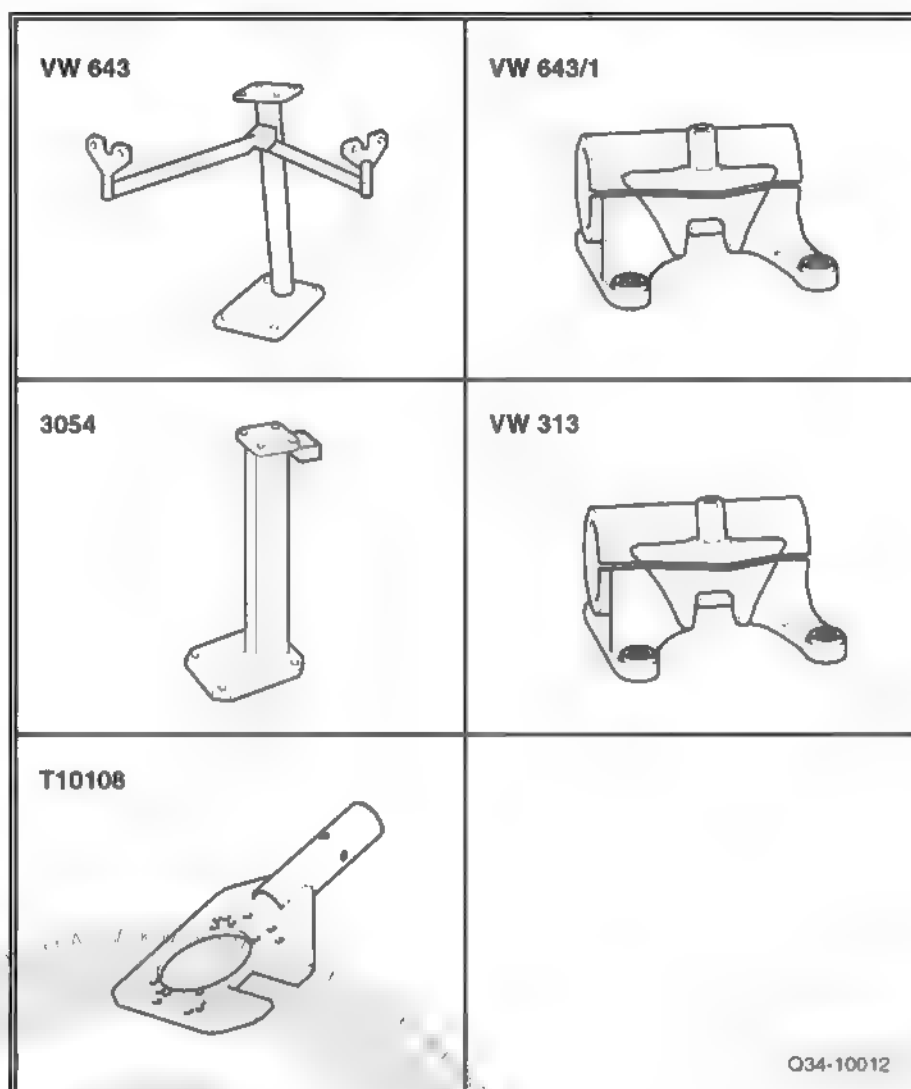
- 1 - Valve 1 for gear selection - N284-
- 2 - Valve ground wire (-)
- 3 - Valve 2 for gear selection - N285-
- 4 - Valve ground wire (-)
- 5 - Valve 3 for gear selection - N286-
- 6 - Valve ground wire (-)
- 7 - Clutch actuator valve - N255-
- 8 - Valve ground wire (-)
- 9 - Not used
- 10 - Not used
- 11 - Power supply (5V)
- 12 - Sensor ground wire (-)
- 13 - Clutch position sensor - G476- - 2
- 14 - Clutch position sensor - G476- - 1





## 4.4 Gear selection mechanism - repair

Special tools and workshop  
equipment required



- ◆ Support for fastening assemblage - VW 643-
- ◆ Support for VW643 - VW 643/1-
- ◆ Mounting bracket - 3054-
- ◆ Support for 3054 - VW 313-
- ◆ Gearbox support - T10108-

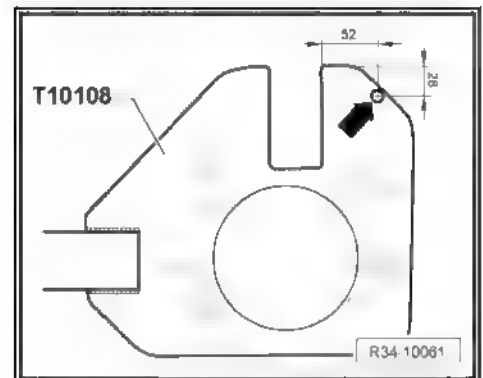


Modify the support for gearbox mounting - T10108- :

A new bore is required to fasten the automated transmission (ASG) 0C3 to the gearbox mounting.

Dimensions in mm:

- Drill a 11.0 mm  $\varnothing$  hole -arrow- in the gearbox mounting - T10108- .

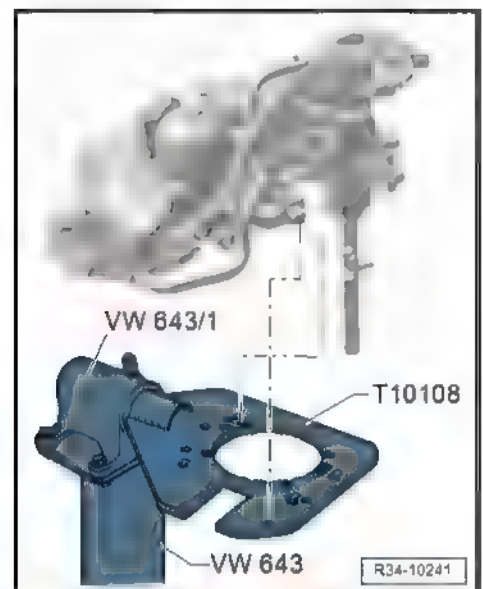


To facilitate the disassembly and assembly of the gear selector mechanism, use the gearbox mounting - T10108- as indicated:



Note

*It is possible to remove and install some components with the gear selection mechanism installed in the gearbox (removed from the vehicle).*



#### 4.4.1 Electro-valves set - assembly overview



WARNING

- ◆ When handling chemicals follow the safety instructions ⇒ Chemical Products Manual; Rep. gr. 00
- ◆ Assignment of Chemical Materials ⇒ Electronic Parts Catalogue "ETKA"



**1 - Gear selection mechanism**  
- adjust

- ☐ "Actuator Pack".
- ☐ Remove and install  
➔ [page 35](#) .

**2 - Selector lever valve 1 -**  
N284- "EV1"

- ☐ Remove and install  
➔ [page 50](#) .
- ☐ Apply Nyogel - G 052 817 A1- to the contact pins.
- ☐ Check with the Vehicle diagnostic, testing and information system  
⇒ Vehicle diagnostic tester.

**3 - Selector lever valve 2 -**  
N285- "EV2"

- ☐ Remove and install  
➔ [page 50](#) .
- ☐ Apply Nyogel - G 052 817 A1- to the contact pins.
- ☐ Check with the Vehicle diagnostic, testing and information system  
⇒ Vehicle diagnostic tester.

**4 - Clutch actuator valve -**  
N255- "EV0"

- ☐ Remove and install  
➔ [page 50](#) .
- ☐ Apply Nyogel - G 052 817 A1- to the contact pins.
- ☐ Check with the Vehicle diagnostic, testing and information system ⇒ Vehicle diagnostic tester.

**5 - Selector lever valve 3 - N286- "EV3"**

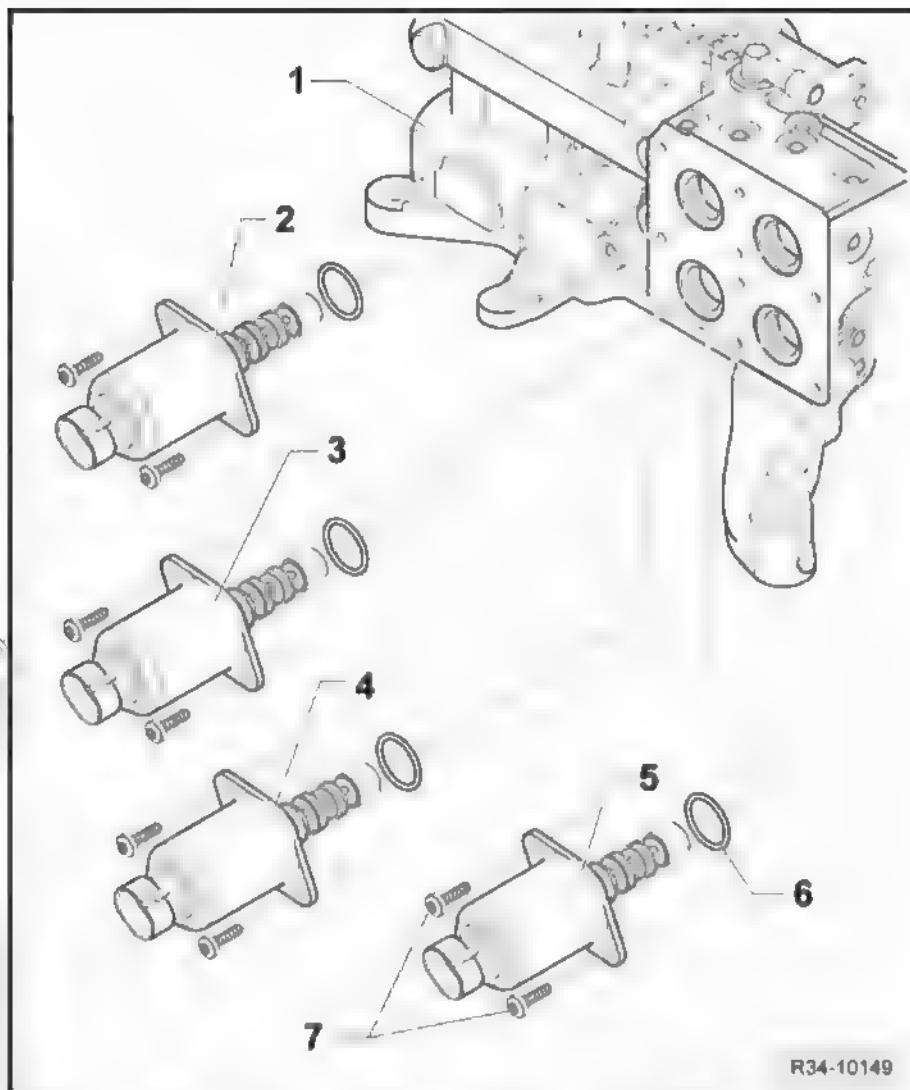
- ☐ Remove and install ➔ [page 50](#) .
- ☐ Apply Nyogel - G 052 817 A1- to the contact pins.
- ☐ Check with the Vehicle diagnostic, testing and information system ⇒ Vehicle diagnostic tester.

**6 - O-rings**

- ☐ Replace after every removal
- ☐ 4 units.

**7 - Bolts**

- ☐ 8 units
- ☐  $3.6 \pm 0.6$  Nm.



## 4.4.2 Electro-valves set - remove and install

**Removal:**

- Remove the gear selection mechanism ➔ [page 35](#) .
- Install the gear selection mechanism on the gearbox mounting  
- T10108- as indicated ➔ [page 49](#) .



**i Note**

*It is possible to remove and install some components with the gear selection mechanism installed in the gearbox (removed from the vehicle).*



**WARNING**

*Before disconnecting the connectors from the valves, mark their respective positions. Observe the electro-valve connectors "EV0" and "EV3", they have a yellow identification tape.*

Mark the position of the connectors to their respective electro-valves.

- ◆ Connector -1- for the Clutch actuator valve - N255- "EV0" identified with YELLOW TAPE
- ◆ Connector -2- for the Gear selection valve 1 - N284- "EV1"
- ◆ Connector -3- for the Gear selection valve 2 - N285- "EV2"
- ◆ Connector -4- for the Gear selection valve 3 - N286- "EV3" indicated with YELLOW TAPE
- Remove the fastening screws and then remove the electro-valves.

Installation:

Installation is performed in reverse to removal sequence, considering the following:

- Check and replace the O-rings if necessary -4- of the Gear selection valve 1 - N284-, Clutch actuator valve - N255-, Gear selection valve 2 - N285- and Gear selection valve 3 - N286-.

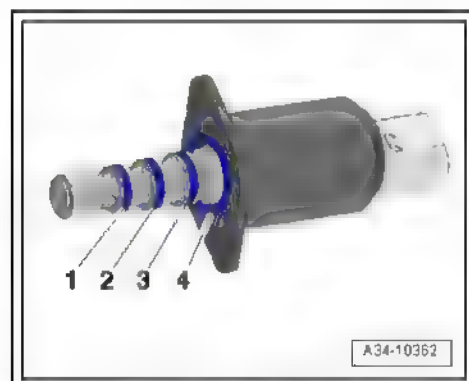
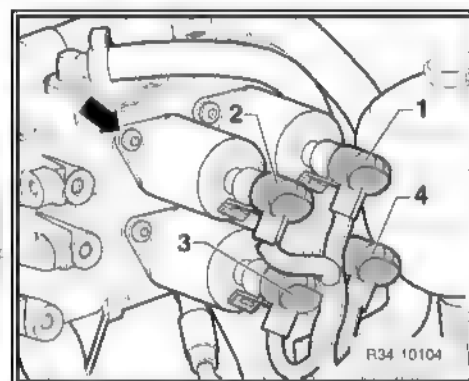
1- Black O-ring

2- Green O-ring

3- Black O-ring

4- Green O-ring

- Install and fasten the electro-valves fastening screws.



Component	Tightening torque
Electro-valve fastening screws	3.6 ± 0.6 Nm

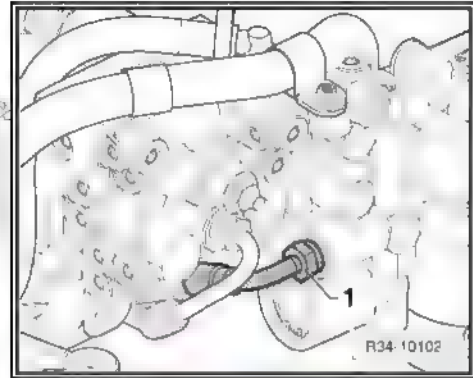
- After installation, fill and check the tank hydraulic oil level  
⇒ [page 90](#).

#### 4.4.3 High-pressure slave cylinder - replace

- Remove the transmission ➔ [page 63](#).



- Loosen and remove the hexagonal connection of the high-pressure tube -1- with the 1/2" (inch) wrench.

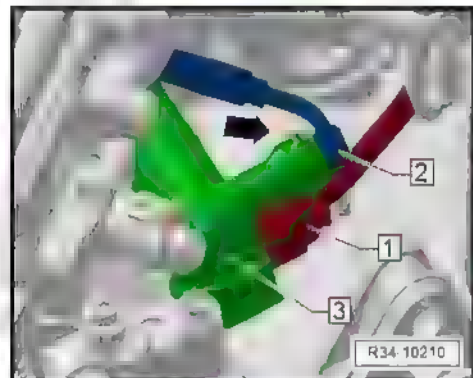


- Detach the lock -arrow- and remove the high-pressure connection tube -2- from the slave cylinder -3-.



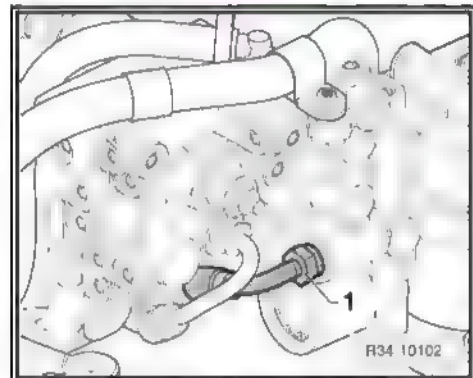
#### WARNING

- ◆ *Cleaning is necessary to avoid any contamination inside the slave cylinder or the high-pressure tube.*
- ◆ *Pay attention to the general repair instructions ➔ [page 7](#).*



Installation is performed in reverse to removal sequence, considering the following:

- Install a new high pressure tube of the slave cylinder and tighten the hexagon connection -1- of the high pressure tube.



Component	Tightening torque
Connection for the slave cylinder high-pressure tube	17 ± 1 Nm

- After replacement, check and complete the tank oil level  
➔ [page 89](#)

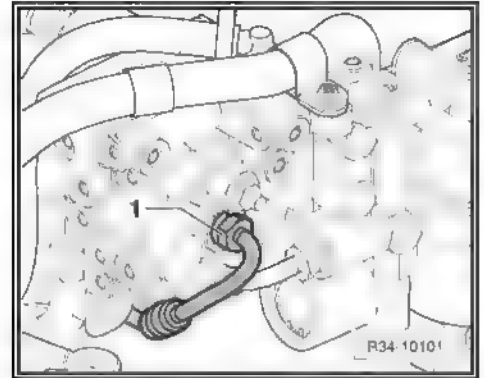
#### 4.4.4 Pressure tube - replace

- Remove the gear selection mechanism ➔ [page 35](#).
- Install the gear selection mechanism on the gearbox mounting  
- T10108- as indicated ➔ [page 49](#).





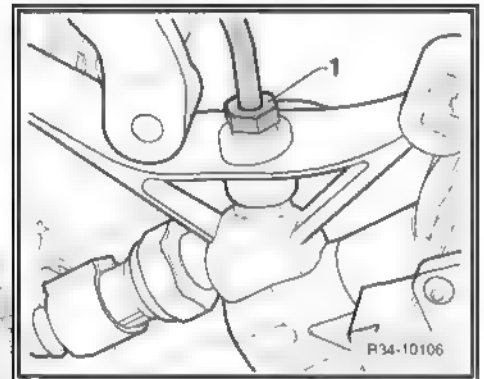
- Loosen and remove the hexagon connection of the pressure tube -1- with the Actuator Pack. Use a 1/2 " (inch) wrench.



- Loosen and remove the hexagon connection of the pressure tube -1- with the Power Pack. Use a 1/2 " (inch) wrench.

Installation is performed in reverse to removal sequence, considering the following:

- Install and fasten the hexagonal connections -1- of the high pressure tube.



Component	Tightening torque
High-pressure tube connections	$17 \pm 1$ Nm

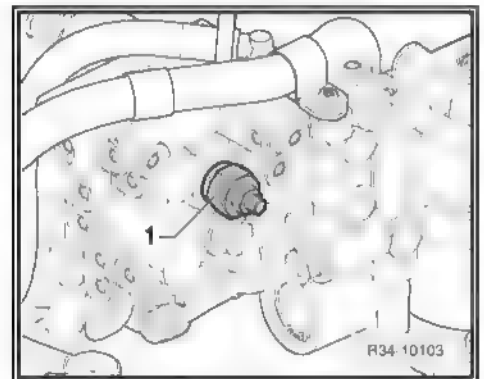
- After replacement, check and complete the tank oil level  
⇒ [page 89](#)

#### 4.4.5 Maximum pressure valve - replace

- Remove the gear selection mechanism ⇒ [page 35](#) .
- Remove the maximum pressure valve -1- with a 17 mm wrench.

Installation is performed in reverse to removal sequence, considering the following:

- Install and fasten the maximum pressure valve -1-.



Component	Tightening torque
Maximum pressure valve	$40 \pm 4$ Nm

- After replacement, check and complete the tank oil level  
⇒ [page 89](#)



#### 4.4.6 Gearbox hydraulic pressure sensor - G270- - replace



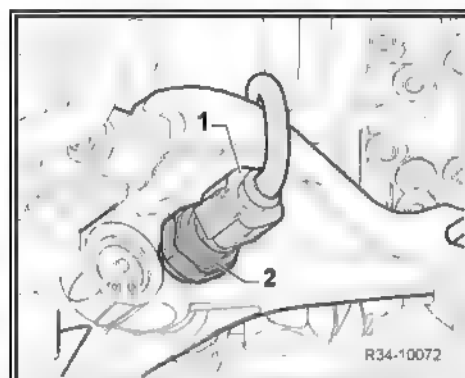
##### WARNING

- ◆ When handling chemicals follow the safety instructions ⇒ *Chemical Products Manual; Rep. gr. 00*
- ◆ Assignment of Chemical Materials ⇒ *Electronic Parts Catalogue "ETKA"*

- Remove the gear selection mechanism ⇒ [page 35](#) .
- Install the gear selection mechanism on the gearbox mounting - T10108- as indicated ⇒ [page 49](#) .
- Disconnect connector -1-.
- Loosen and remove the Gearbox hydraulic pressure sensor - G270- -2-.

Installation is performed in reverse to removal sequence, considering the following:

- Loosen and remove the Gearbox hydraulic pressure sensor - G270- -2-.



Component	Tightening torque
Gearbox hydraulic pressure sender - G270-	15 ± 1.5 Nm

- Apply Nyogel - G 052 817 A1- on the connection pins for the Gearbox hydraulic pressure sensor - G270- -2-.
- After replacement, check and complete the tank oil level ⇒ [page 89](#)

#### 4.4.7 Hydraulic oil reservoir - remove and install

##### Removal:

- Remove the gear selection mechanism ⇒ [page 35](#) .
- Install the gear selection mechanism on the gearbox mounting - T10108- as indicated ⇒ [page 49](#) .
- Drain the hydraulic oil from the reservoir.

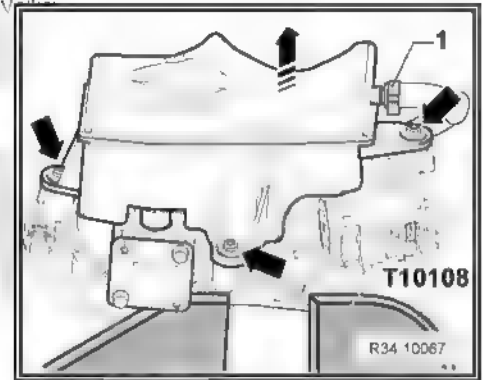


- Remove clamp -1-.
- Loosen fastening screws -arrows- and remove the hydraulic oil reservoir in the direction of the -arrow-.

Installation:

Installation is performed in reverse to removal sequence, considering the following:

- Replace the reservoir sealing ring.
- Install the sealing ring onto the reservoir exit tube.
- Install the hydraulic oil reservoir and tighten the fastening screws.



Component	Tightening torque
Hydraulic reservoir fastening screws	$3.6 \pm 1 \text{ Nm}$

- After installation, fill and check the tank oil level ➤ [page 89](#)

#### 4.4.8 Electric motor for the Hydraulic gearbox pump - V387- - remove and install



#### WARNING

*When replacement is necessary, the entire set "Electric motor and hydraulic pump" must be replaced.*

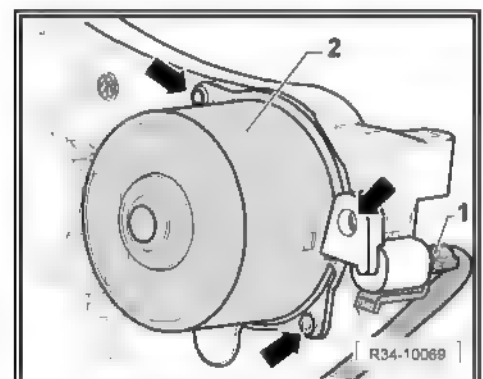
- ◆ *When handling chemicals follow the safety instructions ➤ Chemical Products Manual; Rep. gr. 00*
- ◆ *Assignment of Chemical Materials ➤ Electronic Parts Catalogue "ETKA"*

Removal:

- Remove the gear selection mechanism ➤ [page 35](#) .
- Install the gear selection mechanism on the gearbox mounting - T10108- as indicated ➤ [page 49](#) .
- Drain the hydraulic oil from the reservoir.
- Remove the hydraulic oil reservoir ➤ [page 54](#) .
- Disconnect connector -1-.
- Remove the fastening screws -arrows- and remove the electric motor -2-.

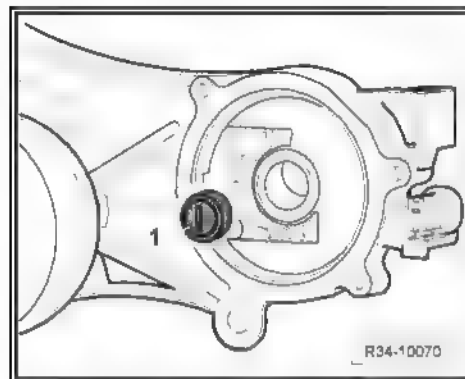
Installation:

Installation is performed in reverse to removal sequence, considering the following:

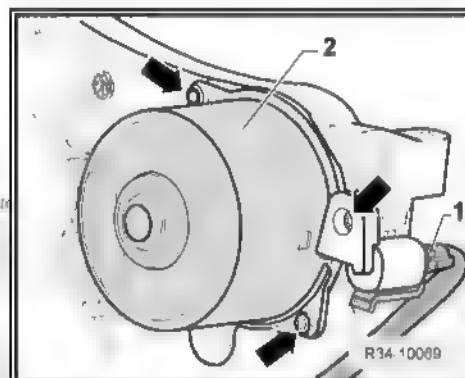




- Position the coupling -1- on the axle of the Hydraulic gearbox pump - V387- .



- Install the electric motor -2- and tighten the fastening screws -arrows-.



Component	Tightening torque
Electric motor fastening screws	$6 \pm 1$ Nm

- Apply Nyogel - G 052 817 A1- to the connector contact pins -1-.
- After installation, check and complete the tank oil level  
⇒ [page 89](#) .

#### 4.4.9 Gearbox hydraulic pressure pump - V387- - remove and install



##### WARNING

*When replacement is necessary, the entire set "Electric motor and hydraulic pump" must be replaced.*

##### Removal:

- Remove the gear selection mechanism ⇒ [page 35](#) .
- Install the gear selection mechanism on the gearbox mounting - T10108- as indicated ⇒ [page 49](#) .
- Drain the hydraulic oil from the reservoir.
- Remove the hydraulic oil reservoir ⇒ [page 54](#) .

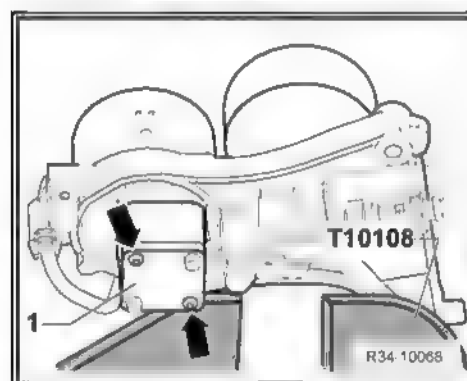
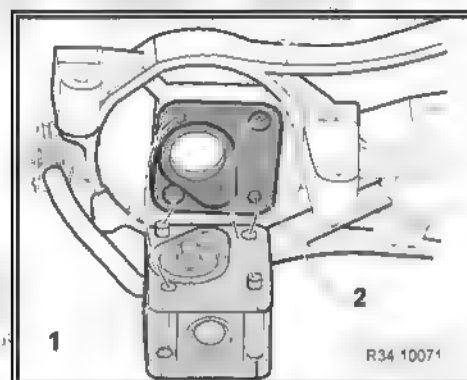
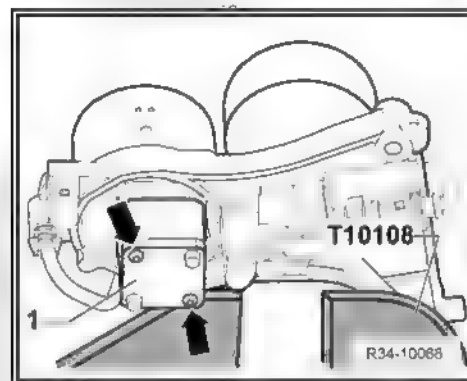


- Remove the securing bolts -arrows-.
- Remove the Hydraulic gearbox pump - V387- -1-.

#### Installation:

Installation is performed in reverse to removal sequence, considering the following:

- Replace sealing rings.
- Install the Hydraulic gearbox pump - V387- on the case of hydraulic set -2-.
- Install and tighten the fastening screws -arrows- for the Hydraulic gearbox pump - V387- -1-.



Component	Tightening torque
Fastening screw for the Hydraulic gearbox pump - V387-	5.5 ± 1 Nm

- After installation, check and complete the tank oil level  
 ⇒ [page 89](#)

#### 4.4.10 Return tube - replace

- Remove the gear selection mechanism ⇒ [page 35](#).
- Install the gear selection mechanism on the gearbox mounting  
 - T10108- as indicated → [page 49](#)
- Drain the hydraulic oil from the reservoir.



- Carefully remove clamp -1-.
- Detach the return tube -2-. If necessary, cut the tube at the -arrow- to facilitate detachment

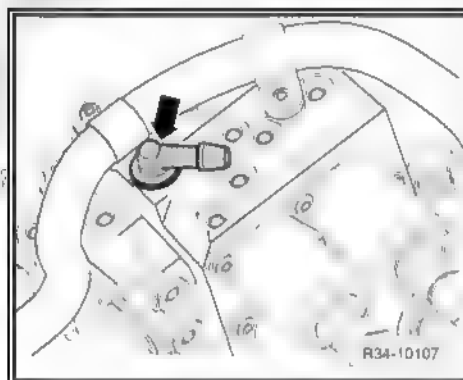
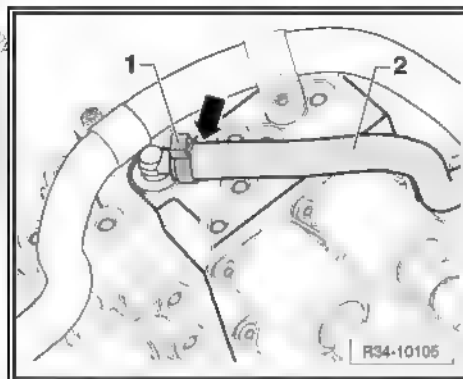


#### WARNING

*Carefully remove the clamp and return tube so that the oil return connector -arrow- is not damaged. Otherwise the entire "Actuator Pack" actuator set will have to be replaced.*

Installation is performed in reverse to removal sequence, considering the following:

- Install the new return tube and use the new clamps for the appropriate bolting.
- After replacement, check and complete the tank oil level  
⇒ [page 89](#)

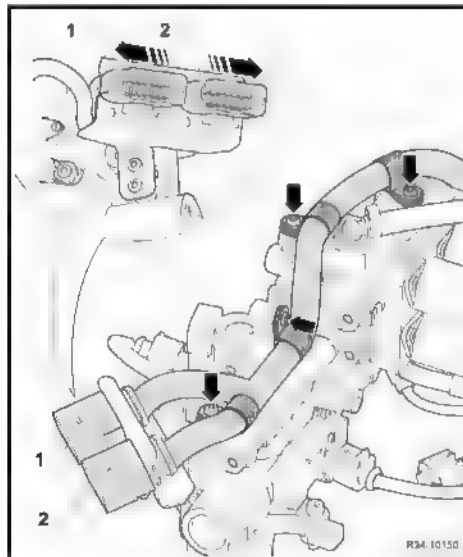


#### 4.4.11 Wiring harness - remove and install

- Remove the transmission ⇒ [page 63](#) .
- Mark the position of the connectors to their respective electrovalves ⇒ [page 51](#) .
- Disconnect the various connectors from the wiring harness.
- Remove the securing bolts -arrows-.
- Detach the connectors -1- and -2- from the support in the direction of the -arrows-.

Installation:

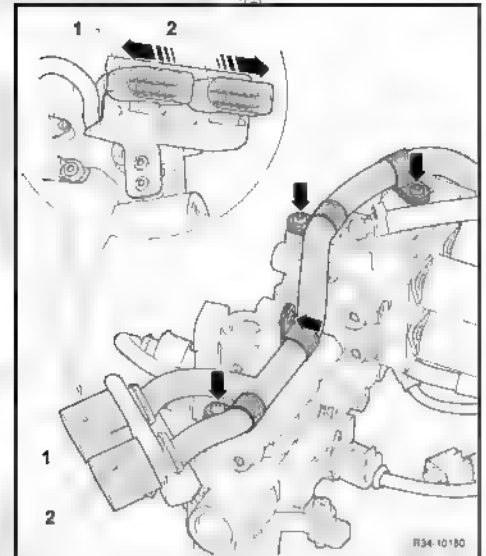
Installation is performed in reverse to removal sequence, considering the following:







- Install the wiring harness and tighten the fastening screws -arrows- for the clamps.



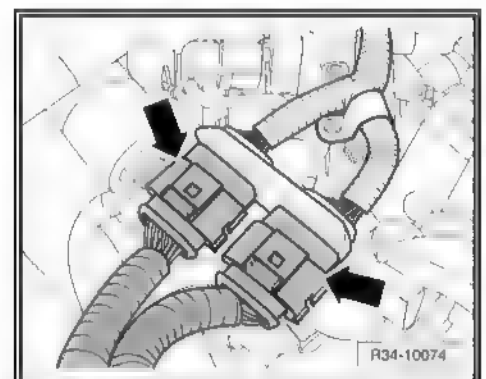
Component	Tightening torque
Wiring harness fastening screws	$3.6 \pm 0.6 \text{ Nm}$

- Install transmission [⇒ page 61](#) .

#### 4.4.12 Connector bracket (wiring harness) -re-move and install

##### Removal:

- Disconnect the Battery - A- ⇒ Electrical equipment; Rep. gr. 27 ; Starter, alternator, battery .
- Remove the Battery - A- ⇒ Electric equipment; Rep. gr. 27 ; Starter, alternator, battery .
- Remove the air filter behind the Battery - A- ⇒ Engine; Rep. gr. 24 ; Fuel supply - injection system .
- Remove the console from the Battery - A- ⇒ Electrical equipment; Rep. gr. 27 ; Starter, alternator, battery .
- Disconnect the connectors -arrows-.



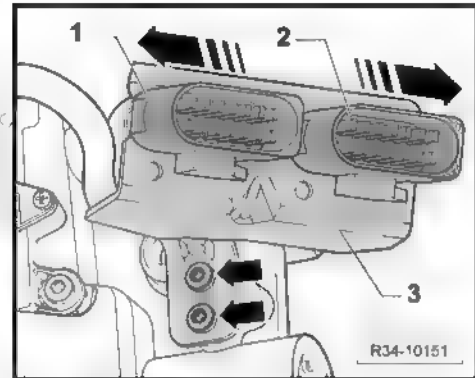


- Remove the fastening screws -arrows- on the support -3-.
- Detach the connectors -1- and -2- in the direction of the -arrows- and remove the support -3-.

**Installation:**

Installation is performed in reverse to removal sequence, considering the following:

- Install the support -3- and tighten the fastening screws -arrows-.



Component	Tightening torque
Fastening screws for the wiring harness support	$3.6 \pm 1 \text{ Nm}$



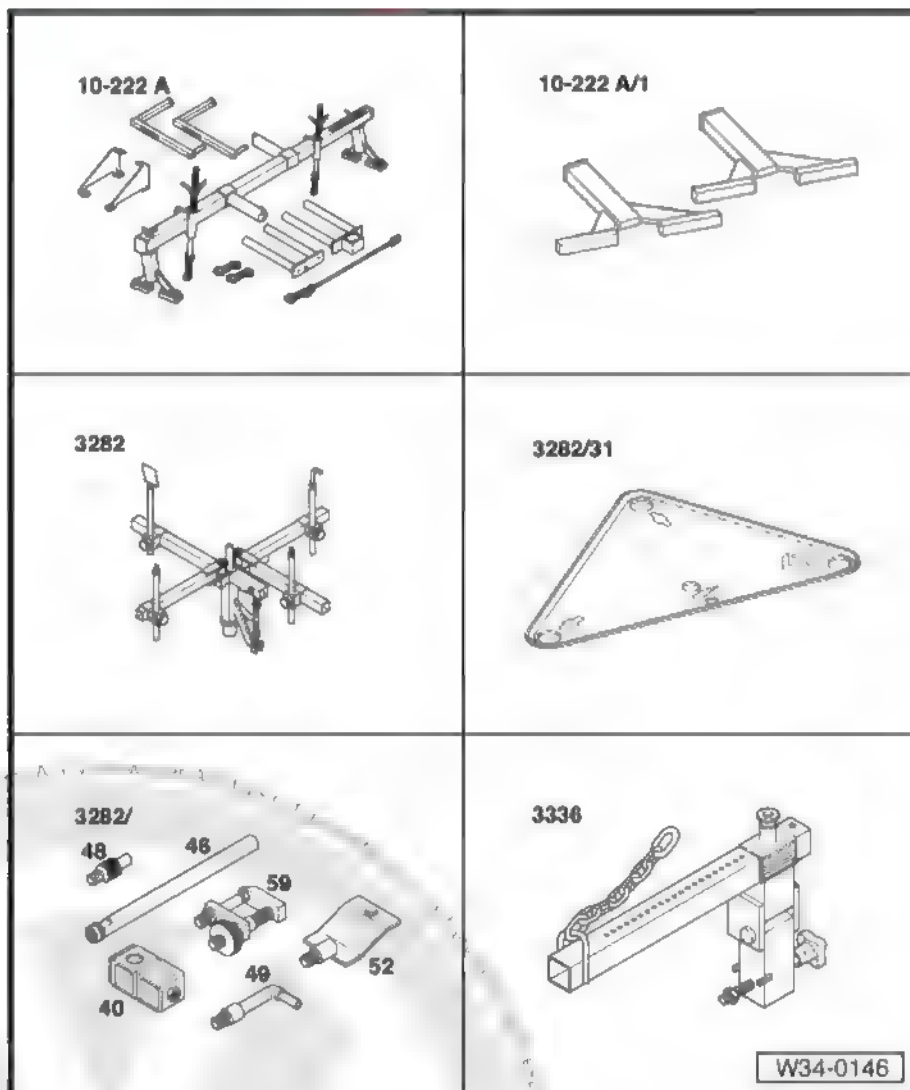
## 5 Transmission - remove and install

→ "5.1 Transmission - remove and install", page 61

→ "5.2 Gearbox - transport", page 71

### 5.1 Transmission - remove and install

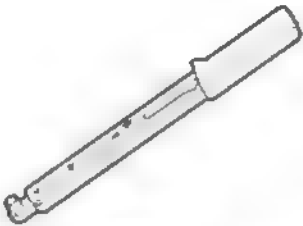
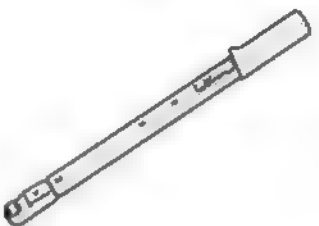
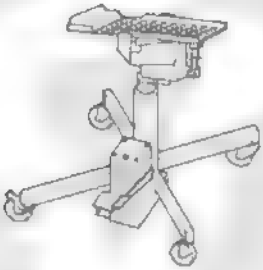
Special tools and workshop  
equipment required



- ◆ Support or VW 061 - 10-222A-
- ◆ Support - 10-222 A/1-
- ◆ Mounting bracket - 3282-
- ◆ Adjustment plate - 3282/31-
- ◆ Pin - 3282/48-
- ◆ Mounting bracket - 3282/59-
- ◆ Mounting bracket - 3336-



Special tools and workshop  
equipment required

<b>VAG 1331</b> 	<b>VAG 1332</b> 
<b>VAG 1383A</b> 	
	Q34-10015

- ◆ Torque wrench - 5 to 50 Nm ( 1/2" drive) - VAG 1331-
- ◆ Torque Wrench - 40 to 200 Nm (1 1/2" drive) - VAG 1332-
- ◆ Gearbox or engine + gearbox set jack or EQ 7081 - VAG 1383A-

### 5.1.1 Removal



#### WARNING

*Before removing the transmission, you should first:*

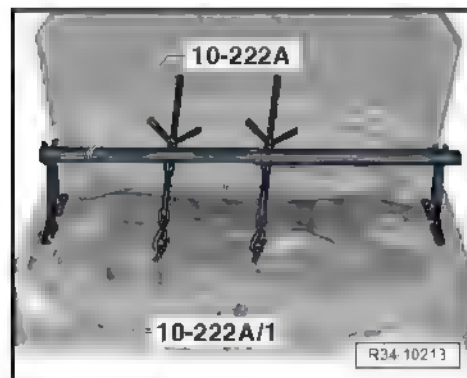
- ◆ *Consult the fault memory.*
- ◆ *Relieve the pressure from the hydraulic system (depressurizing).*

*If those procedures have not been performed, you should consult ➔ [page 35](#) .*

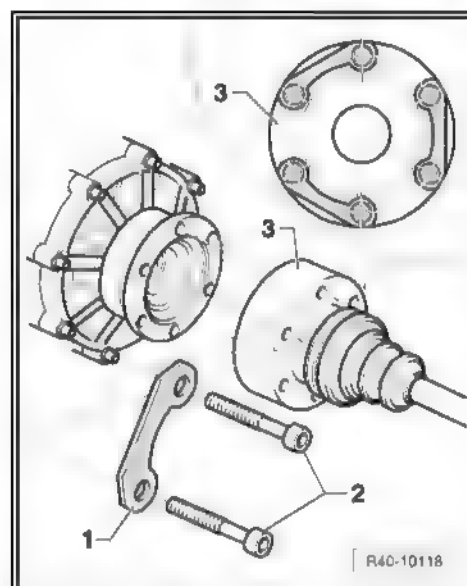


If the pressure relieve from the hydraulic system has already been performed, follow the instructions:

- Install Bracket or VW 061 - 10-222A- with Support - 10-222A/1- and sustain slightly the engine/gearbox.
- Relieve the engine/gearbox assembly weight through the fuses
- Remove upper screws fastening the engine to gearbox
- Lift the vehicle ➔ Maintenance ; Booklet 22.1 ; Service descriptions, vehicle lifting .

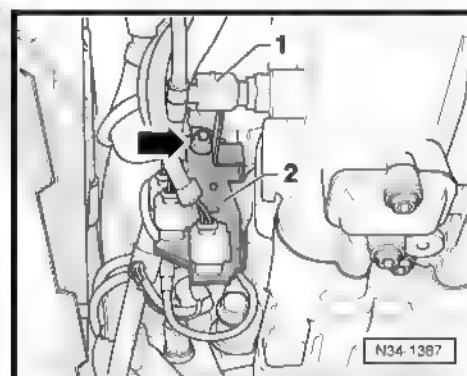


- Slightly loosen the securing bolts (left and right) -2- of the drive shafts with constant velocity joint -3- to the transmission drive flanges.
- Remove the front wheels.
- Remove the left front wheel arch cover ➔ General body repairs, exterior; Rep. gr. 66 ; External equipment .



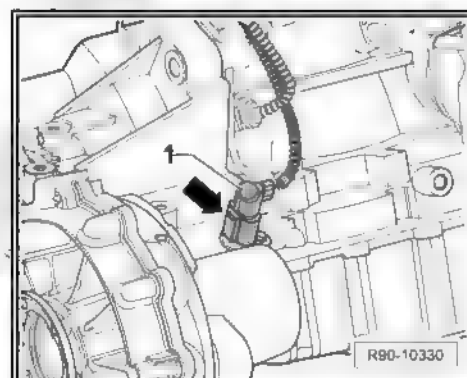
- Disengage connector -1- from reverse gear light switch - F4- .
- Loosen the securing nut -arrow- and remove the cable support -2- from the Starter - - .
- Remove the Starter - B- ➔ Electrical system; Rep. gr. 27 ; Starter, alternator, battery .
- Remove connectors' bracket.

Continuation for vehicles without ABS:



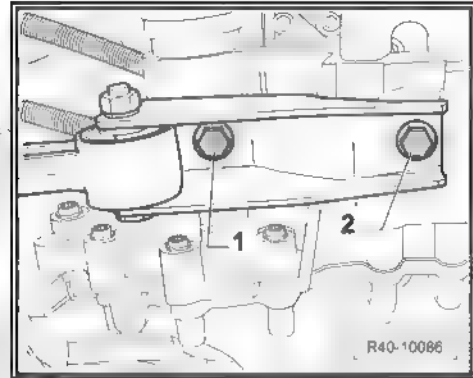
- Disengage connector -1- from the Speed sensor - G22- .

Continued for all vehicles:





- Remove the fastening screws-1- and -2- from pendulum support
- Remove the front (exhaust) tube ⇒ Engine, Rep. gr. 26 , Exhaust system .
- Remove the auxiliary frame (subframe) ⇒ Chassis, axles, steering; Rep gr 40 ; Front suspension



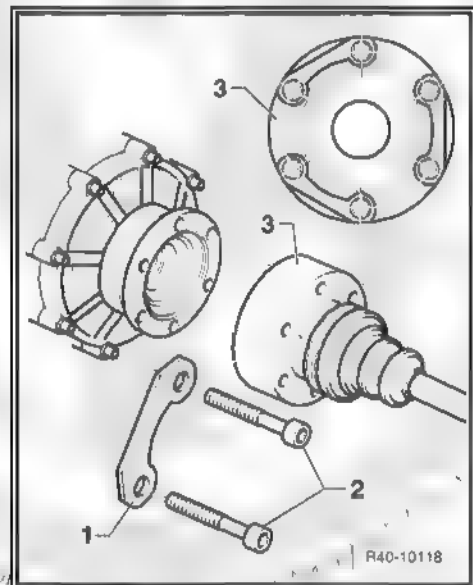
- Remove the securing bolts (left and right) -3- of the drive shafts with constant velocity joint -3- to the transmission drive flanges.



#### Note

*The drive shafts with constant velocity joint must not be pressed downwards. Otherwise, the internal articulation will be damaged due to excessive tilt. Place the drive shafts upwards and fasten them with wire on the suspension strut.*

- Lower the vehicle.

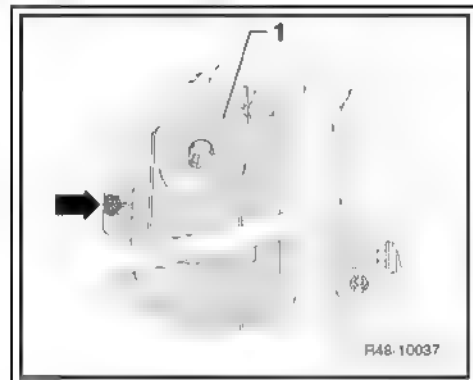


- Remove the fastening screw -arrow- from the buffer tank. Consult ⇒ Chassis, axles, steering; Rep. gr. 48 ; Steering .
- Pull the buffer tank away from its support to make access easier to the fastening screws of the engine side support.



#### WARNING

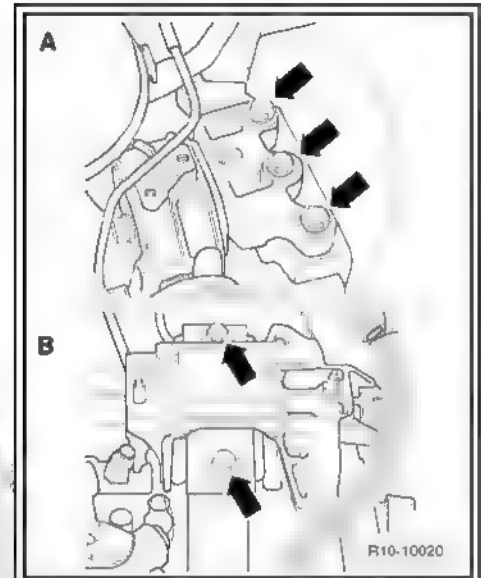
*Carefully move the buffer tank.*







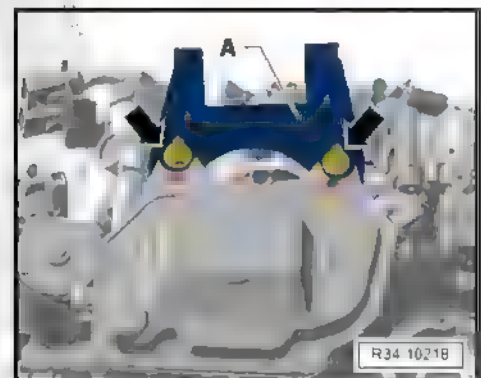
- Remove the fastening screws -arrows- from the supports (Engine and transmission side).
- Carefully tilt the engine/gearbox assembly. For such, turn the bolts of the support or VW 061 - 10-222A- until there is space to remove the gearbox/selector mechanism.
- Remove the bolting of the power steering piping.



Remove the fastening screws -arrows- and remove the console -A-.

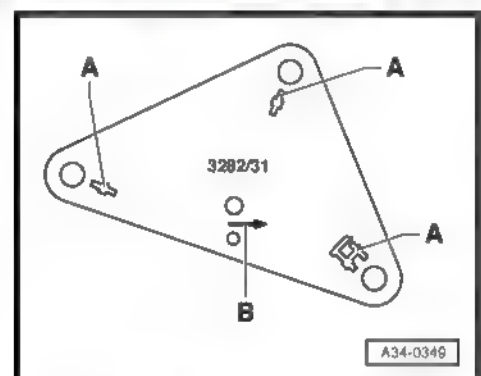
Install Bracket - 3282- with Shim - 3282/31- to remove the gearbox/gear selection mechanism.

Install the shift unit arms aligned with the shim holes.

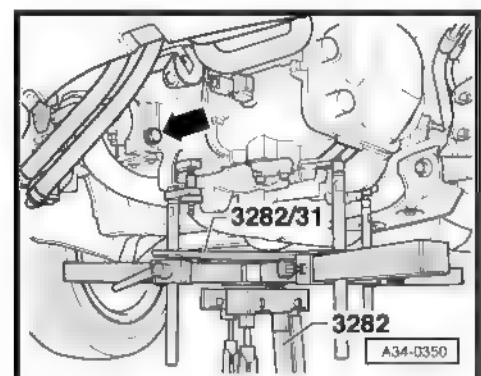


The symbols -A- on the Shim - 3282/31- show the supports required, and arrow -B- indicates run direction.

- Place the Gearbox or engine + gearbox set jack or EQ 7081 - VAG 1383A- under the gearbox.



- Align the shim and engage the safety bracket to the gearbox.
- Fasten the gearbox to the Support - 3282- and remove the engine/gearbox fastening screw -arrow-.



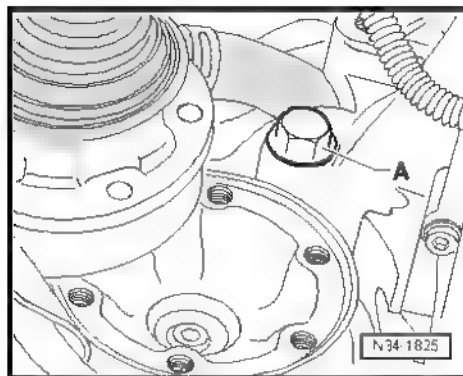


- Loosen screw -A- fastening the engine to gearbox by over the right propelling flange.
- Remove the lower fastening screws for the engine/gearbox.
- Carefully separate the gearbox from the engine.



#### Caution

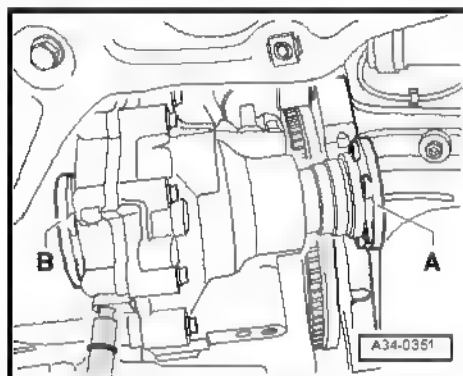
*In this operation, you should prevent the gearbox/gear selection mechanism from touching the body.*



- Next, lower carefully the gearbox by passing the right drive flange -A- close to the flywheel/intermediate plate, and the left drive flange -B-.
- When lowering, change the gearbox position by the spindle of the gearbox or engine + gearbox set jack or EQ 7081 - VAG 1383A-.

If it is necessary to remove the gearbox gear selection mechanism, continue in:

- Remove the gear selection mechanism ⇒ [page 41](#).



## 5.1.2 Installation



#### WARNING

- ◆ When handling chemicals follow the safety instructions ⇒ *Chemical Products Manual; Rep. gr. 00*
- ◆ Assignment of Chemical Materials ⇒ *Electronic Parts Catalogue "ETKA"*

Installation is performed in reverse to removal sequence, considering the following:



#### WARNING

*Always replace self-locking screws/nuts subject to angular torque.*

Continuation for:

Gear selector mechanism removed from the gearbox:

- Install the gear selection mechanism ⇒ [page 42](#).

Gear selector mechanism installed in the gearbox:

- Clean input shaft splines and lubricate them slightly with Lubricating grease - G 000 100-.

The clutch plate can easily displace from one side to another on the input shaft.

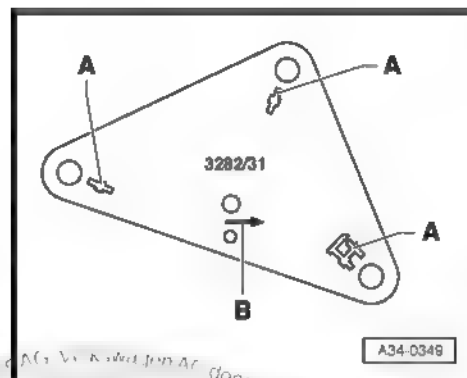
- Check whether the engine/transmission alignment pins are installed on the cylinder block, install them, if absent.
- Make sure the intermediate plate is correctly installed on engine.



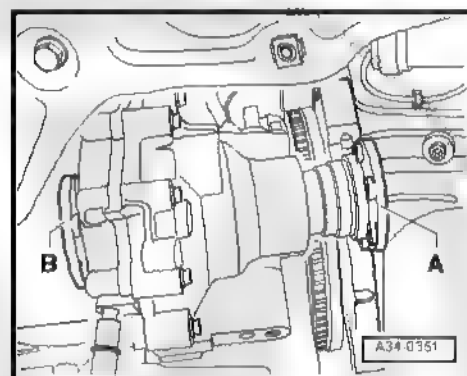
- Install the Bracket - 3282- with shim - 3282/31- to install gearbox.

The symbols -A- on the Shim - 3282/31- show the supports required, and arrow -B- indicates run direction.

- Align the plate parallel to the gearbox and engage safety bracket to the gearbox.
- Fasten gearbox to Support - 3282- .
- Place the Gearbox or engine + gearbox set jack or EQ 7081 - VAG 1383A- under the vehicle. In such a way that the arrow -B- on Bracket - 3282- is toward the vehicle driving direction.



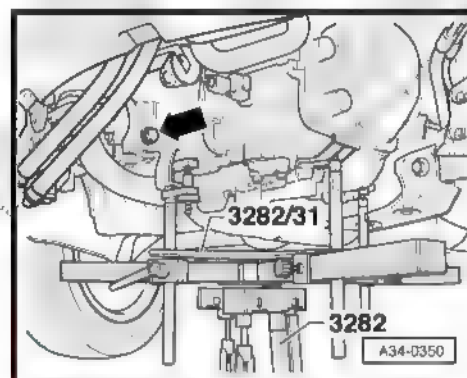
- Lift the gearbox carefully by passing the right drive flange (right side) -A- close to the flywheel/intermediate plate, and the left drive flange (left side) -B-.
- When raising, change the gearbox position by the spindle of the Gearbox or engine + gearbox set jack or EQ 7081 - VAG 1383A- .
- Then, using the spindles of the Support - 3282- , turn the gearbox up.
- Install the gearbox.



#### Caution

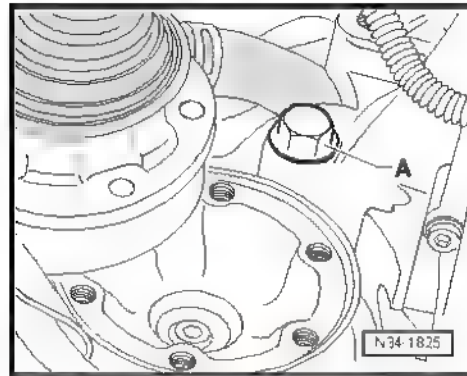
- ◆ In this operation, you should prevent the gearbox/gear selection mechanism from touching the body.
- ◆ Pay attention to prevent damages on the cooling hose, located between engine and radiator, and the power steering pipes.

- Install and tighten the engine/gearbox fastening screw -arrow-. Tightening torques, refer to: ➔ [page 71](#) .

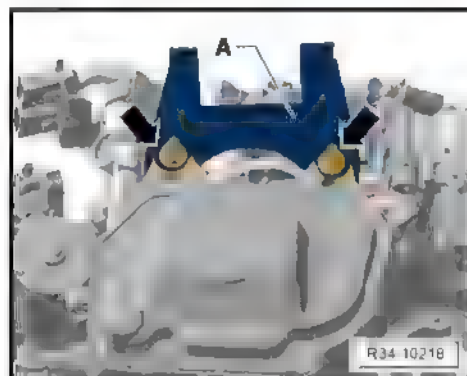




- Install and tighten the engine/gearbox fastening screw -A- from above the drive flange (right side). Tightening torque, see: ➤ [page 71](#) .
- Install and tighten the (lower) engine fastening screws in the gearbox.



- Install the gearbox console -A- using new bolts -arrows-. Tightening torque, see: ➤ [page 71](#) .
- Lower the vehicle.
- Align engine/gearbox aggregate, by placing it in assembly position. To do that, turn the two screws on the Bracket or VW 061 - 10-222A- upwards.



- Install and fasten the fastening screws -arrows- of the supports (engine and transmission side).



#### Note

*Tighten the support fastening screws (engine side / gearbox side) without tension. Refer to ➤ Engine; Rep. gr. 10 ; Cylinders, cylinder block, support, protector.*



#### Caution

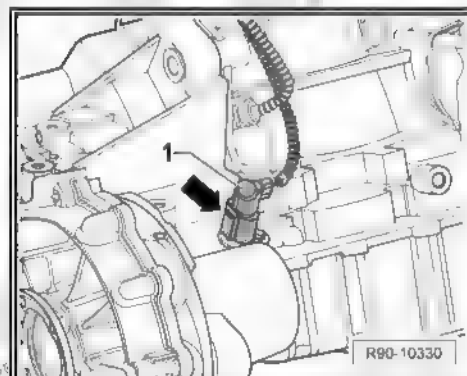
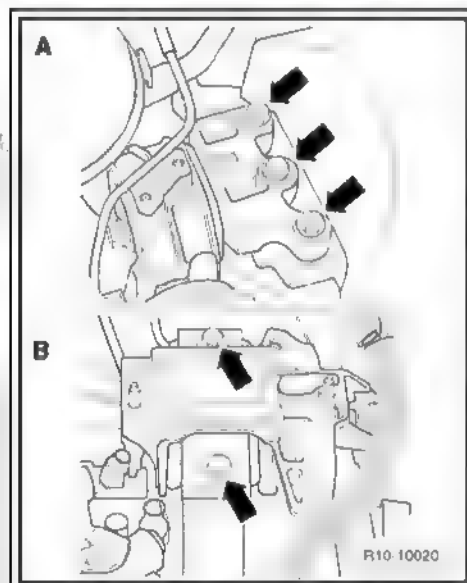
- ◆ Do not remove the Support or VW 061 - 10-222A- until tightening all the screws (torqued) on the engine/gearbox support.

- Lift the vehicle.

For vehicles without ABS:

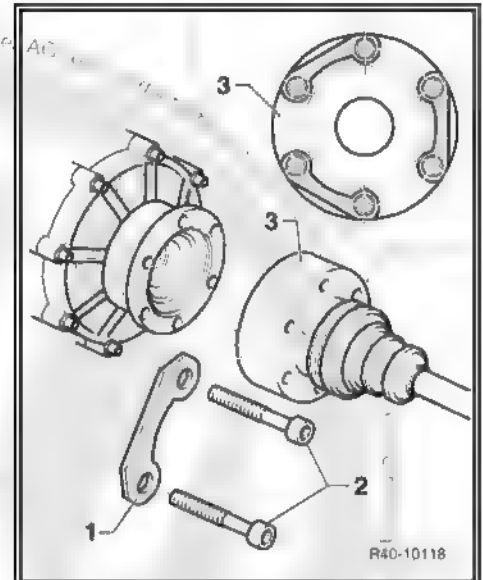
- Connect the connector -1- to Speed sensor - G22- .

Continuation for all:

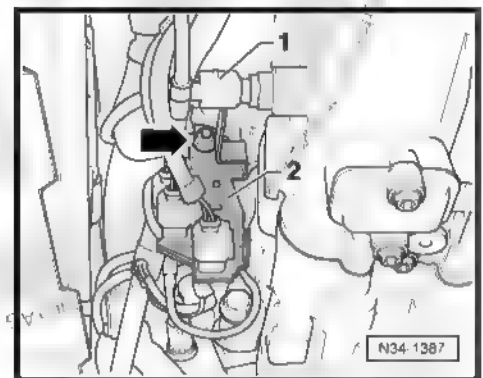




- Install the securing bolts (left and right) -2- of the drive shafts with constant velocity joint -3- to the transmission drive flanges. Refer to → Chassis, axles, steering, Rep. gr. 40 ; Front suspension .
- Install the Starter - B- ⇒ Electrical system ; Rep. gr. 27 ; Starter, alternator, battery .



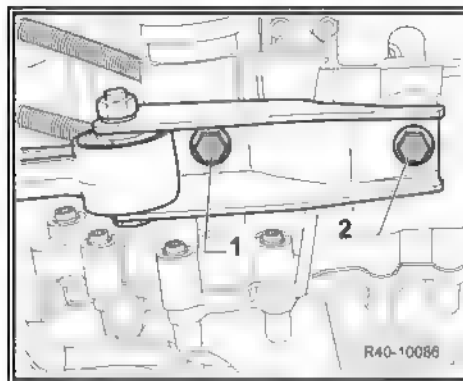
- Install the connectors bracket -2- on the securing bolt -arrow- of the Starter - - .
- Disengage connector -1- from reverse gear light switch - F4- .
- Install connectors on their brackets.
- Lower the vehicle.
- Install and tighten the upper screws that fasten the engine to gearbox. Tightening torques, refer to: [page 71](#) .
- Install the ground wire of the upper securing bolt of the engine/ transmission.
- Lift the vehicle.
- Install the auxiliary frame (subframe) ⇒ Chassis, axles, steering; Rep. gr. 40 ; Front suspension







- Install new fastening screws-1- and -2- from pendulum support. Tightening torques, refer to ➤ [page 71](#) .
- Install the front (exhaust) tube ➔ Engine; Rep. gr. 26 ; Exhaust system .
- Install the left front wheel arch cover ➔ General body repairs, exterior; Rep. gr. 66 ; External equipment .
- Install the front wheels.
- Fill and check the gear oil ➔ [page 87](#) .
- Tighten the front wheels fastening screws . Tightening torques, refer to: ➔ Running gear, axles, steering; Rep. gr. 44 ; Vehicle wheels, tires, measurement .
- Lower the vehicle.
- Install the Battery - A- console ➔ Electrical equipment; Rep. gr. 27 ; Starter, alternator, battery .
- Install the air filter behind the Battery - A- ➔ Engine; Rep. gr. 24 ; Fuel supply - injection system .
- Install and connect the Battery - - ➔ Electrical equipment; Rep. gr. 27 ; Starter motor, alternator, battery .



#### Note

After installation, perform self-diagnostic and basic adjustments.  
See ➔ [page 44](#) .

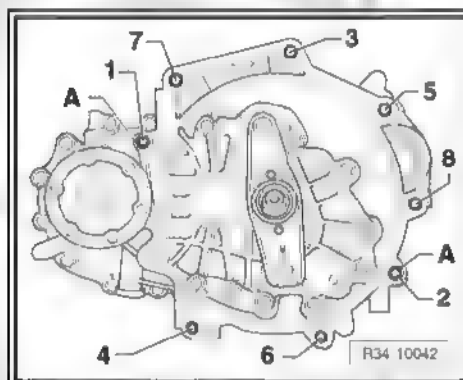
### 5.1.3 Tightening torques

Transmission to engine



#### Note

- ♦ Strictly follow the tightening sequence showed by the illustration
- ♦ -Pos. A- - Adjustment pins



Position	Bolts	Tightening torques
1	M 12 x 70	80 Nm
2	M 12 x 55	80 Nm
3	M 12 x 55	80 Nm
4	M 10 x 50 / M 10 x 55 2)	40 Nm
5	M 12 x 125 also used for fastening the Starter - B-	80 Nm
6	M 10 x 50 / M 10 x 55 2)	40 Nm
7	M 12 x 55	80 Nm
8	M 12 x 125 also used for fastening the Starter - B-	80 Nm

2) Interchangeable

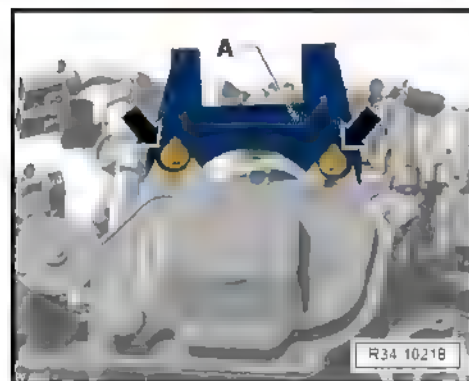




Console -A- to gearbox

A - Console

SETAS - 40 Nm + 90° (Replace after every removal)



Support for power unit - transmission

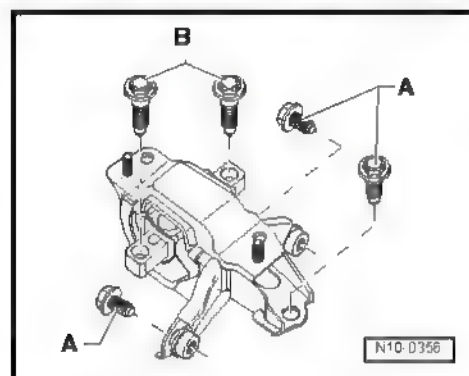
A - 50 Nm + 90° (Replace after every removal)

B - 40 Nm + 90° (Replace after every removal)



Note

*Install engine/gearbox mounting without any stress ⇒ Engine;  
Rep. gr. 10 ; Cylinders, cylinder block, support, cover*



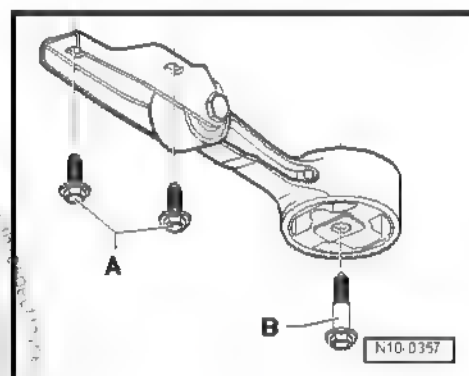
Pendulum support (torque restrictor)

A - 30 Nm + 90° (Replace after every removal)

B - 40 Nm + 90° (Replace after every removal)

For other torques, refer to the respective repair groups:

- ◆ Drive shaft with constant velocity joint to drive flange ⇒ Chassis, axles, steering; Rep. gr. 40 ; Front suspension .
- ◆ Lower drive to wishbone ⇒ Chassis, axles, steering; Rep. gr. 40 ; Front suspension .
- ◆ Coupling bar to wishbone ⇒ Chassis, axles, steering; Rep. gr. 40 ; Front suspension .



## 5.2 Gearbox - transport

Special tools and workshop equipment required

- ◆ Mounting bracket - 3336-

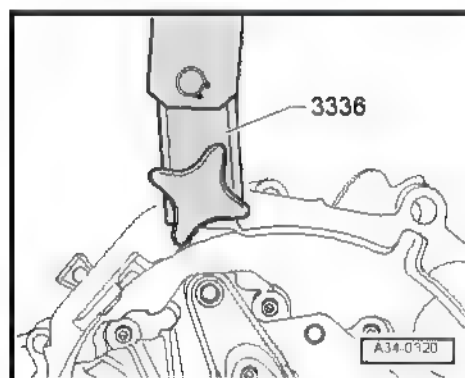




- ◆ Winch 700 - 1200 Kg - VAS 6100-

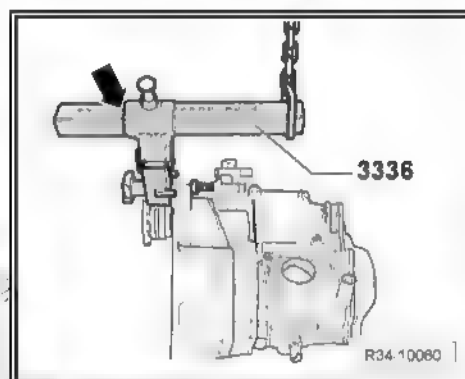


- Install Bracket - 3336- on the gearbox housing.



- Adjust the arm in the guide with the locking pins -arrow-.

Number of visible holes = 6





## 6 Gearbox - disassemble and assemble

→ "6.1 Gearbox - overview", page 73

→ "6.2 gearbox - assembly overview", page 74

→ "6.3 Gearbox housing cover and 5th gear", page 74

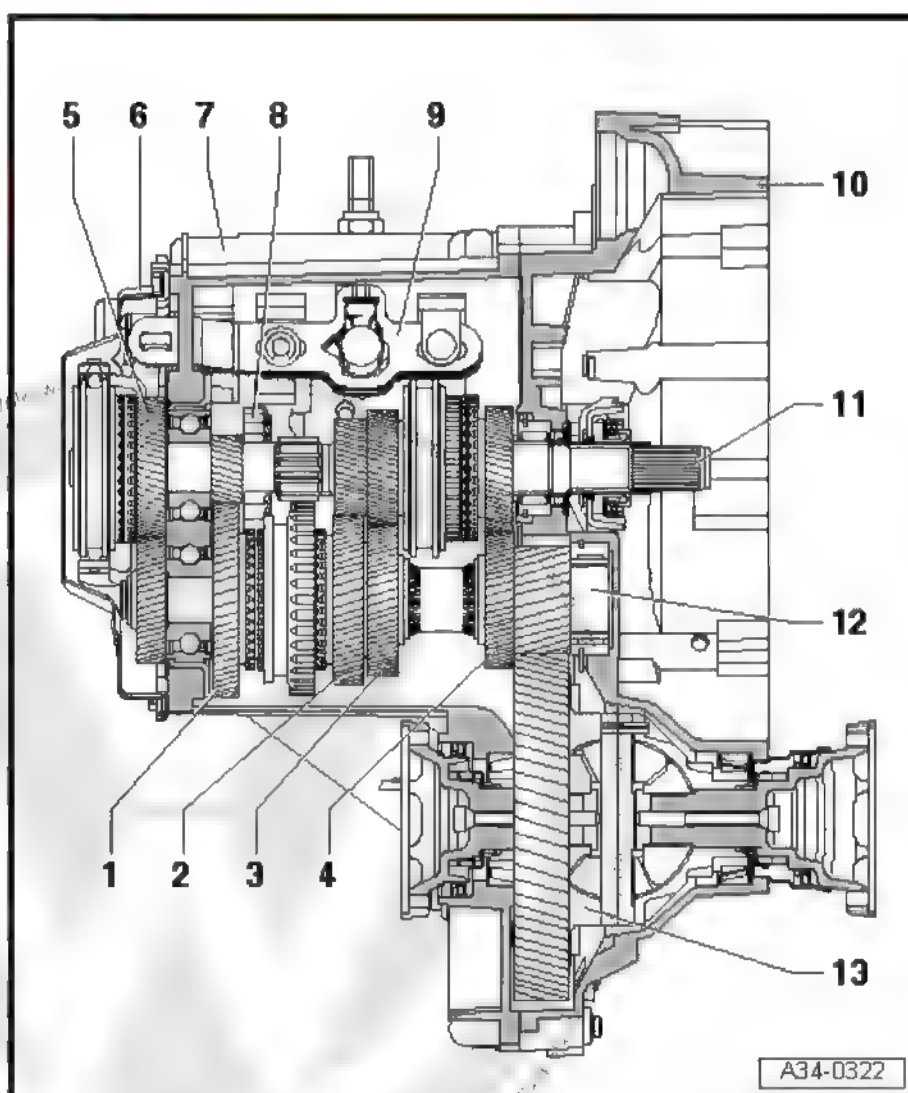
→ "6.4 Clutch housing", page 76

⇒ "6.5 Input shaft, planet pinion, differential, selection mechanism and selector forks", page 77

⇒ "6.6 Input shaft, planet pinion, differential, selection mechanism and selector forks - disassemble and assemble", page 79

### 6.1 Gearbox - overview

- 1 - 1st gear
- 2 - 2nd gear
- 3 - 3rd gear
- 4 - 4th gear
- 5 - 5th gear
- 6 - Gearbox housing cover
- 7 - Gearbox housing
- 8 - Reverse gear
- 9 - Selection mechanism
  - Selector forks.
- 10 - Clutch housing
- 11 - Input shaft
- 12 - Output planet pinion
- 13 - Differential



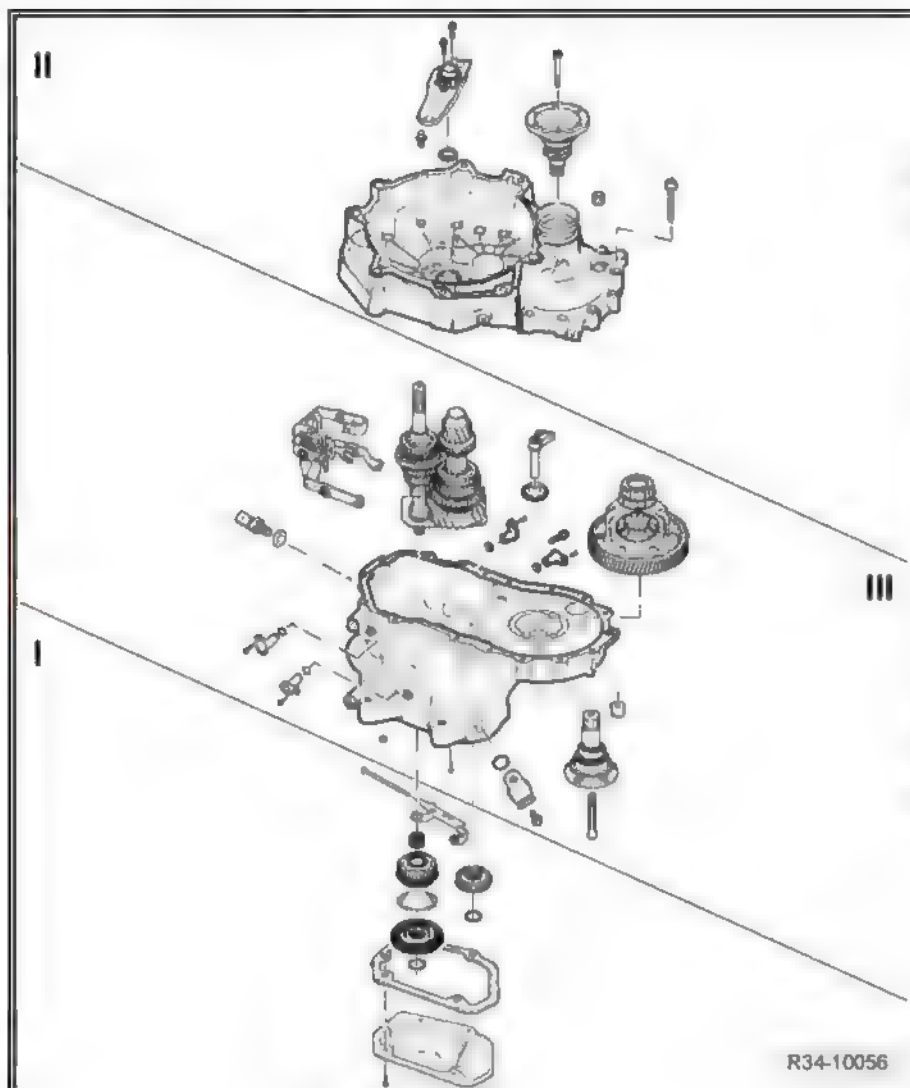


## 6.2 gearbox - assembly overview

I - Gearbox housing cover and 5th gear ➔ [page 74](#) .

II - Clutch housing ➔ [page 76](#) .

III - Input shaft, planet pinion, differential, selection mechanism and selector forks ➔ [page 77](#) .



## 6.3 Gearbox housing cover and 5th gear



### WARNING

- ◆ When handling chemicals follow the safety instructions ➔ *Chemical Products Manual; Rep. gr. 00*
- ◆ Assignment of Chemical Materials ➔ *Electronic Parts Catalogue "ETKA"*



# 1 - Gearbox housing

- ☐ Assignment > Electronic Parts Catalogue "ET-KA".
- ☐ Repair > [page 91](#).
- ☐ Apply Sealing compound - AMV 188 200 03- evenly on the sealing surface.
- ☐ In case of replacement, always adjust differential > [page 138](#).

# 2 - 5th gear wheel

- ☐ Installation position > [page 86](#)

# 3 - Circlip

- ☐ Replace after each removal.
- ☐ Determine thickness > [page 86](#).

# 4 - Gasket

- ☐ Replace if damaged

# 5 - Gearbox housing cover and 5th gear

- ☐ When installing the cap on an installed gearbox, check and replenish the oil level > [page 87](#)

# 6 - Bolts

- ☐ 5 Nm + 90°.
- ☐ Replace after each removal.

# 7 - Circlip

- ☐ Replace after each removal.
- ☐ Determine thickness > [page 86](#).

# 8 - Synchronizer with engaging sleeve and stop ring for 5th gear

- ☐ Disassemble and assemble > [page 102](#).

# 9 - Synchronizer ring for 5th gear

# 10 - Selection wheel for 5th gear

- ☐ Installation position for 5th gear wheel > [page 86](#)

# 11 - Needle bearing

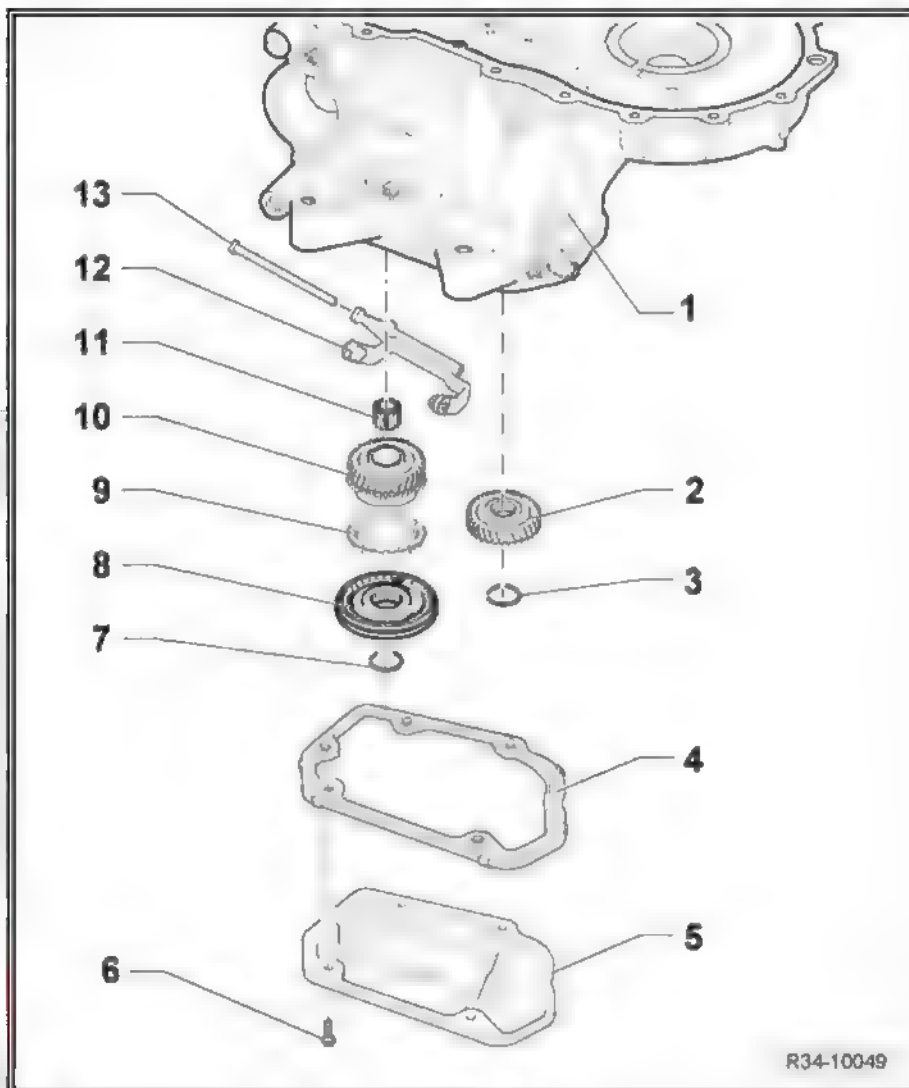
- ☐ For 5th gear.

# 12 - Selector fork for 5th gear

- ☐ Disassemble and assemble > [page 97](#).

# 13 - Bearing pin

- ☐ For 5th gear selector fork.



R34-10049



## 6.4 Clutch housing



### WARNING

- ◆ When handling chemicals follow the safety instructions ⇒ Chemical Products Manual; Rep. gr. 00
- ◆ Assignment of Chemical Materials ⇒ Electronic Parts Catalogue "ETKA"

#### 1 - Countersunk bolt

- 25 Nm.

#### 2 - Drive flange with pressure spring

#### 3 - Bolts

- 5 Nm + 90°.
- Replace after each removal.

#### 4 - Clutch housing

- Assignment ⇒ Electronic Parts Catalogue "ETKA".
- Repair ⇒ [page 91](#).
- Apply Sealing compound - AMV 188 200 03- evenly on the sealing surface.
- In case of replacement, always adjust differential ⇒ [page 138](#).

#### 5 - Gearbox housing

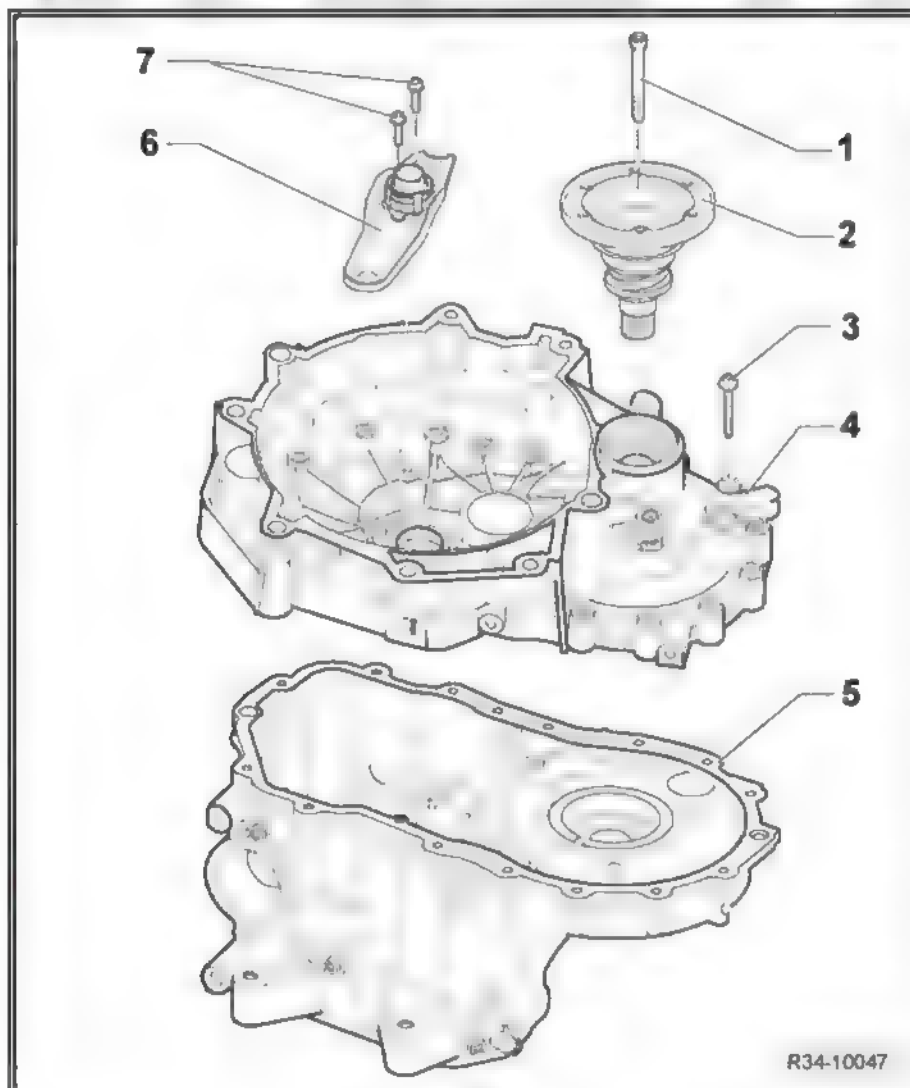
- Assignment ⇒ Electronic Parts Catalogue "ETKA".
- Repair ⇒ [page 91](#).
- Apply Sealing compound - AMV 188 200 03- evenly on the sealing surface.
- In case of replacement, always adjust differential ⇒ [page 138](#).

#### 6 - Clutch lever

- Remove and install with the roller bearing guide and clutch bearing.

#### 7 - Bolts

- 5 Nm + 90°.
- Replace after each removal.







## 6.5 Input shaft, planet pinion, differential, selection mechanism and selector forks



### WARNING

- ◆ When handling chemicals follow the safety instructions ⇒ *Chemical Products Manual; Rep. gr. 00*
- ◆ Assignment of Chemical Materials ⇒ *Electronic Parts Catalogue "ETKA"*

#### 1 - Differential

- ☐ Disassemble and assemble ⇒ [page 129](#) .
- ☐ Assignment ⇒ *Electronic Parts Catalogue "ETKA"* .

#### 2 - Gearbox housing

- ☐ Assignment ⇒ *Electronic Parts Catalogue "ETKA"* .
- ☐ Repair ⇒ [page 91](#) .
- ☐ Apply Sealing compound - AMV 188 200 03- evenly on the sealing surface.
- ☐ In case of replacement, always adjust differential ⇒ [page 138](#) .

#### 3 - Oil draining screw (plug)

- ☐ Screw with inner hex = 32 Nm

#### 4 - Drive flange

#### 5 - Countersunk bolt

- ☐ 25 Nm.

#### 6 - Bolts

- ☐ 5 Nm + 90°.
- ☐ Replace after each removal.
- ☐ For fastening the ball bearing support on the primary drive and pinion ⇒ [Item 14 \(page 78\)](#) .

#### 7 - Hexagonal nut

- ☐ 23 Nm
- ☐ For the selection mechanism ⇒ [Item 13 \(page 78\)](#) .

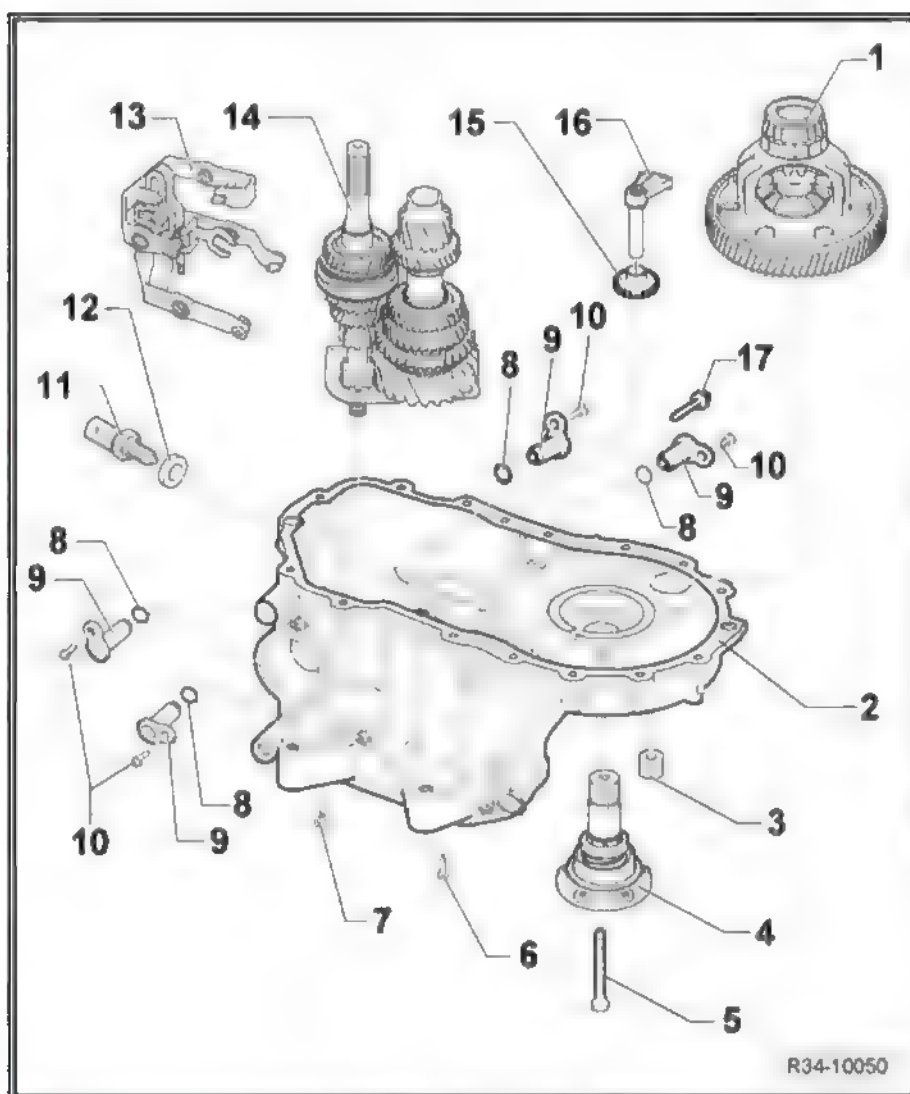
#### 8 - O-ring

- ☐ Replace after each removal.

#### 9 - Bearing pin

#### 10 - Bolts

- ☐ 5 Nm + 90°.
- ☐ Replace after each removal.





**11 - Reversing light switch - F4-**

- ☐  $20 \pm 2$  Nm

**12 - Sealing ring**

- ☐ Only used in some gearbox housings
- ☐ If applicable, replace on installation

**13 - Selection mechanism**

- ☐ Selector forks
- ☐ Disassemble and assemble → [page 97](#) .

**14 - Input shaft and planet pinion with ball bearing support**

- ☐ Clean the threaded holes of the roller bearing support (e.g. Tap M6).
- ☐ Removing the roller bearing support ⇒ [page 108](#)
- ☐ Input shaft - disassemble and assemble the input shaft ⇒ [page 102](#) .
- ☐ Planet pinion - disassemble and assemble ⇒ [page 114](#) .

**15 - Reverse gear**

**16 - Reverse gear intermediate shaft**

**17 - Bolt**

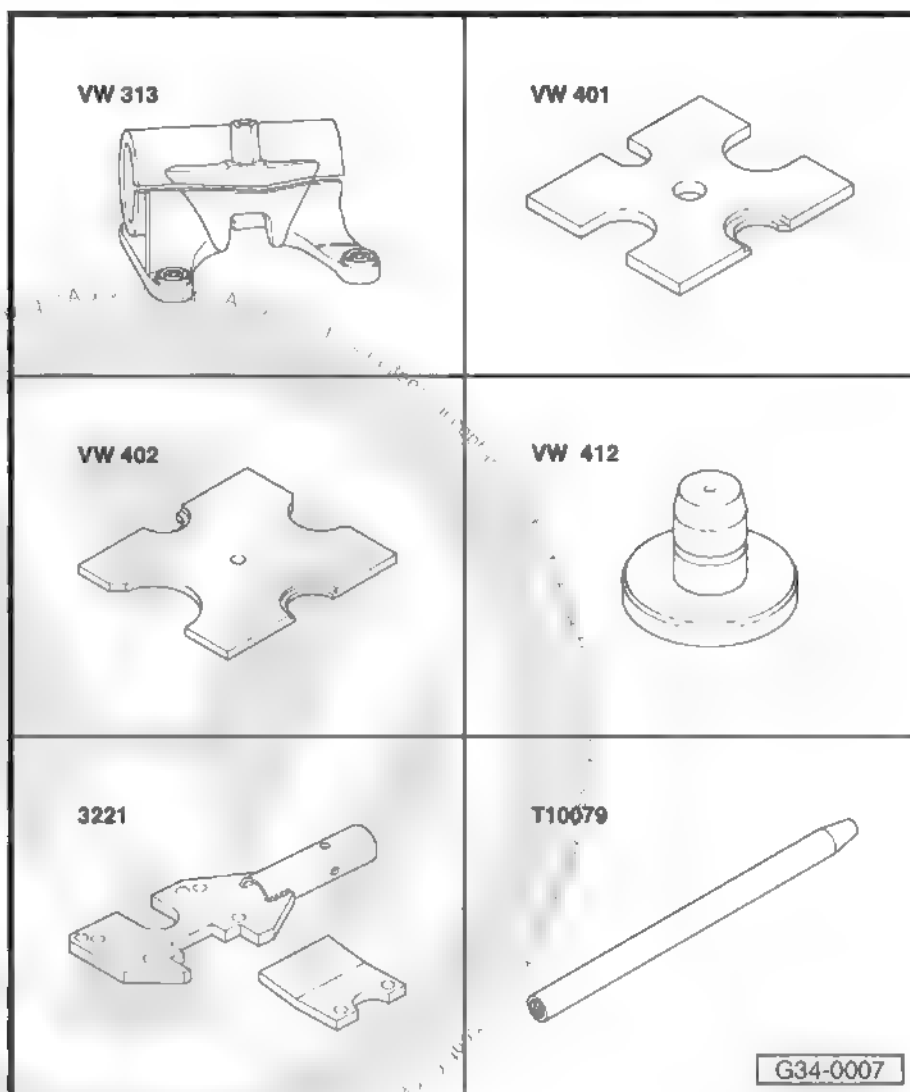
- ☐ For fastening the intermediate reverse gear shaft.
- ☐ M6 = 5 Nm + 90°.
- ☐ M8 = 25 Nm + 90°.
- ☐ Replace after each removal.





## 6.6 Input shaft, planet pinion, differential, selection mechanism and selector forks - disassemble and assemble

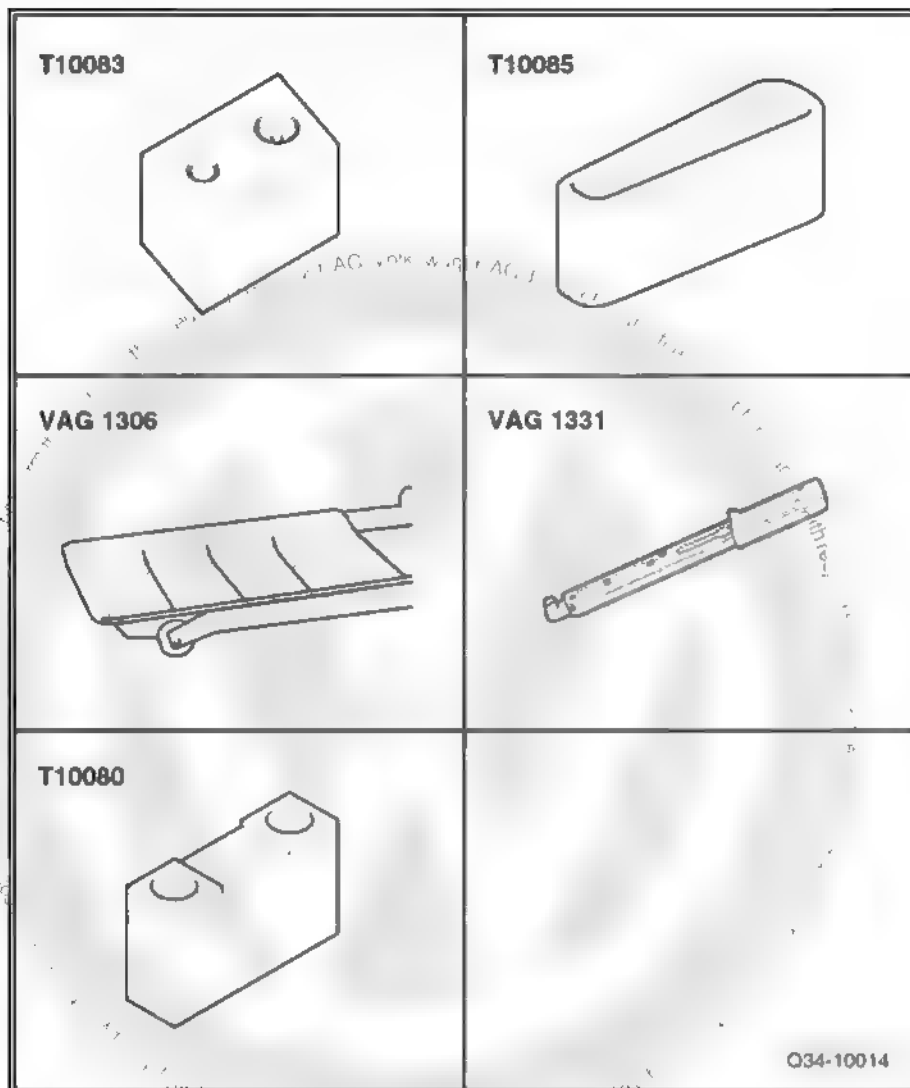
Special tools and workshop equipment required



- ◆ Support for VW643 or VW 643-1, VW 313- or Rotary stand for engine and gearbox - VAS 6095-
- ◆ Plate - VW 401-
- ◆ Plate - VW 402-
- ◆ Pressure disc - VW 412-
- ◆ Mounting bracket - 3221-
- ◆ Guide pin - T 10079-



Special tools and workshop  
equipment required



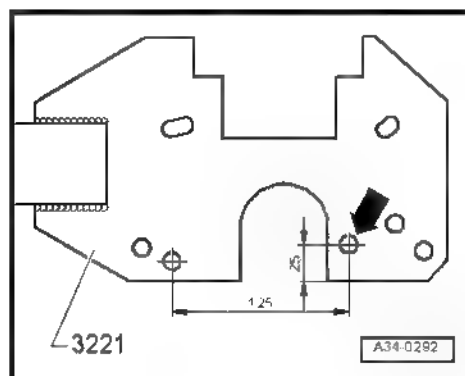
- ◆ Pressure shim - T 10083-
- ◆ Pressure base - T10085-
- ◆ Oil collecting tray - VAG 1306-
- ◆ Torque wrench - 5 to 50 Nm ( 1/2" drive) - VAG 1331-
- ◆ Pressure shim - T10080-

Modify the support for the Support - 3221- :

A new bore is required to fasten the automated transmission  
(ASG) 0C3 to the gearbox mounting

Dimensions in mm:

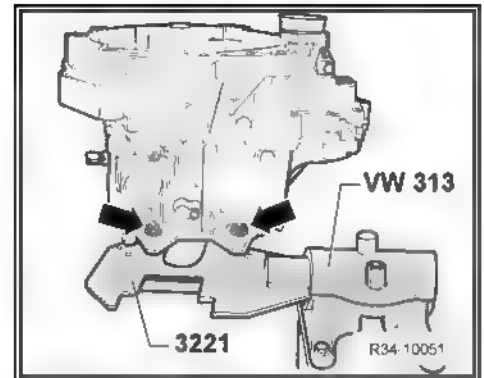
- Make a bore of  $\varnothing 110$  mm -arrow- on the Support - 3221- .



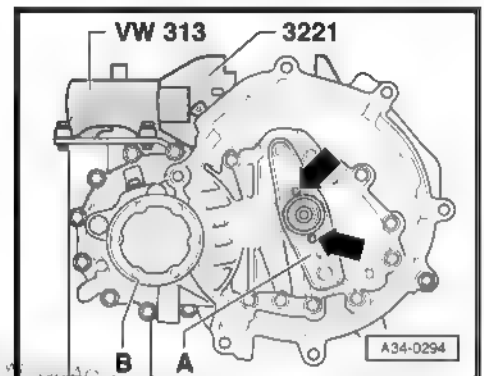


## 6.6.1 Disassembly

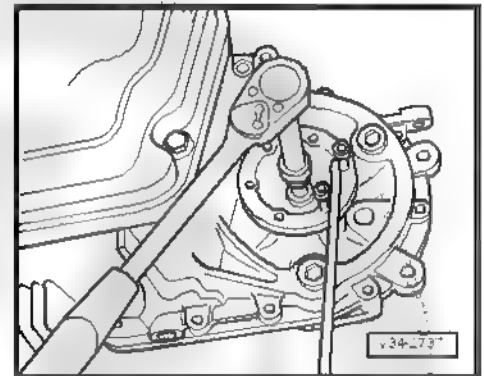
- Fasten the gearbox on the Support for VW643 or VW 643/1 - VW 313- or Rotary stand for engine and gearbox - VAS 6095- -arrows- as indicated.
- Place the Oil collector - VAG 1306- under the gearbox
- Drain the gear oil



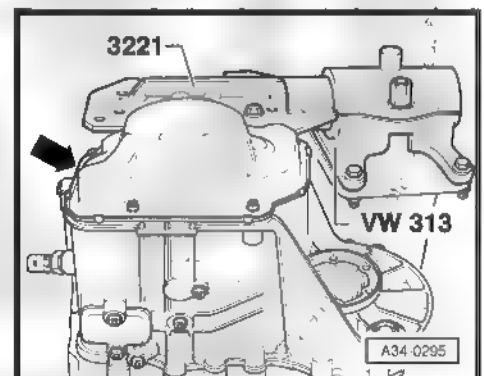
- Remove clutch lever -A- with the clutch bearing and bearing guide -arrows-.



- Remove the drive flange fastening screw on right side -B-, by using two screws to lock the flange with a lever.
- Remove drive flange.

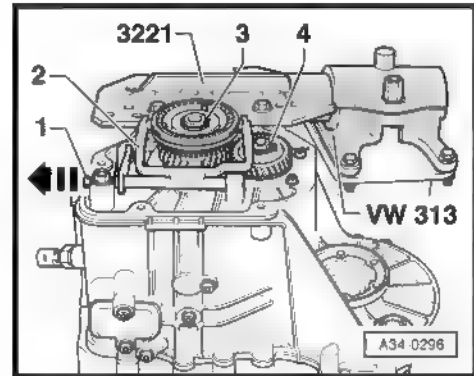


- Remove the transmission housing cover -arrow-.

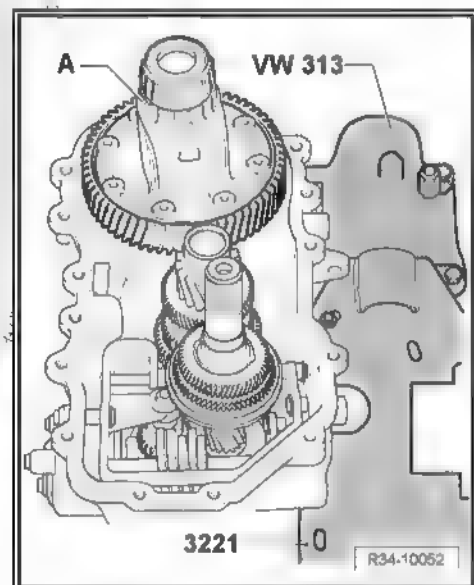
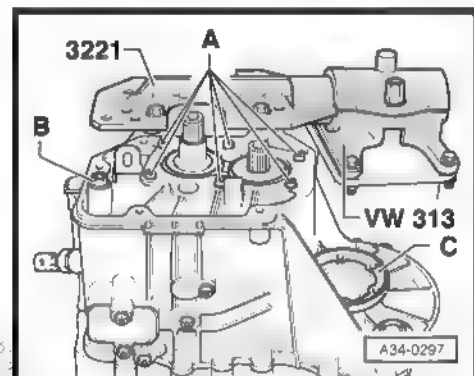




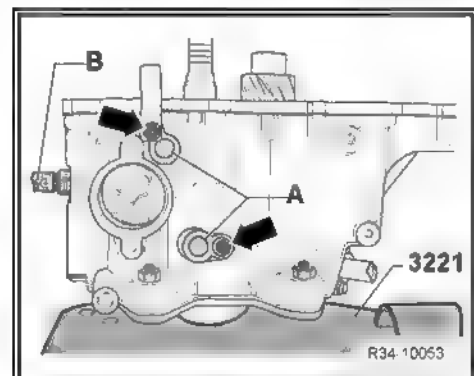
- Remove pin -1- on the 5th gear selector fork bearing -2- and remove the selector fork.
- Remove circlip -3- and remove the 5th gear synchronizer.
- Remove circlip -4- and remove the 5th gear wheel



- Remove the fastening screws -A- from the primary and planet pinion bearings.
- Remove the hex nut -B- from the selection mechanism (reverse gear fastening).
- Remove the drive flange fastening screw on left side -C-, by using two screws to lock the flange with a lever.
- Remove drive flange.
- Place the gearbox with the clutch housing facing upwards.
- Remove the fastening screws from the clutch housing.
- Remove the clutch housing carefully by leveraging via shoulders around the whole case alternately, without damaging the sealing surfaces.
- Remove differential -A- from the transmission housing.



- Remove the fastening screws -arrows- and remove the pins from the bearings -A- from the upper section of the gearbox.
- Remove the reverse gear light switch - F4- -B-.
- Remove the Gearbox rotation sensor - G182- .







- Remove screw -A- that fastens the reverse gear wheel shaft.
- Remove bearing pins -B- from the lower gearbox part



#### Note

*Do not remove the cover cap -arrow- to disassemble the transmission.*

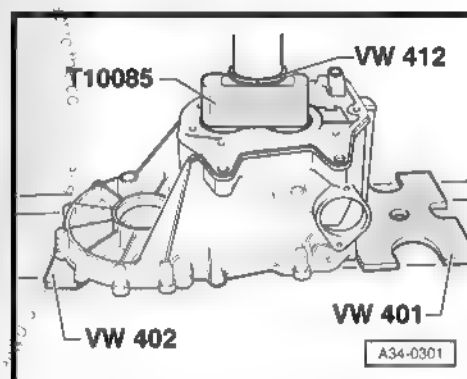
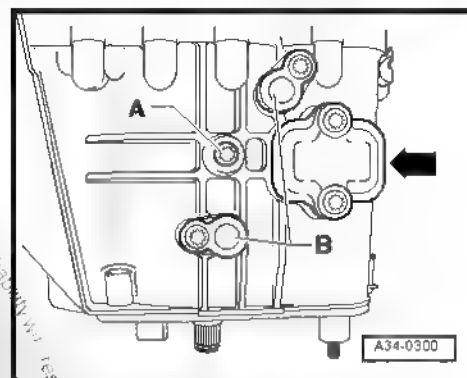
- Install the gearbox housing over the Plate - VW 401- and Plate VW 402- , in order that the case adjustment pins are not damaged

- Remove primary and planet pinions simultaneously from the roller bearing support, with the selection mechanism (selector fork) and the reverse gear wheel.



#### Note

*During pressing, make sure the parts do not fall; if required, ask for help from a second mechanic.*



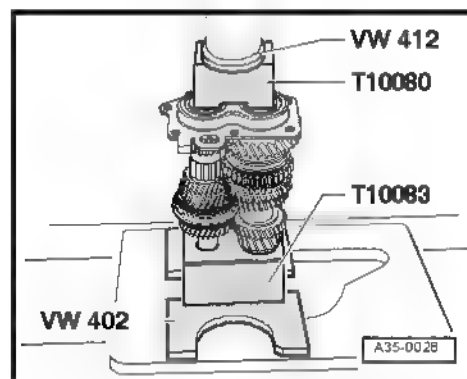
## 6.6.2 Assembly



### WARNING

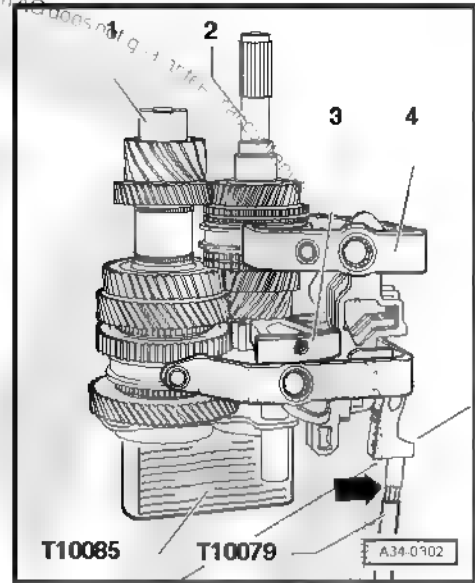
- ◆ When handling chemicals follow the safety instructions ⇒ Chemical Products Manual; Rep. gr. 00
- ◆ Assignment of Chemical Materials ⇒ Electronic Parts Catalogue "ETKA"

- Simultaneously install the primary drive shaft and the pinion on the bearing support using the Pressure shim - T 10083- and Pressure shim - T 10080- .

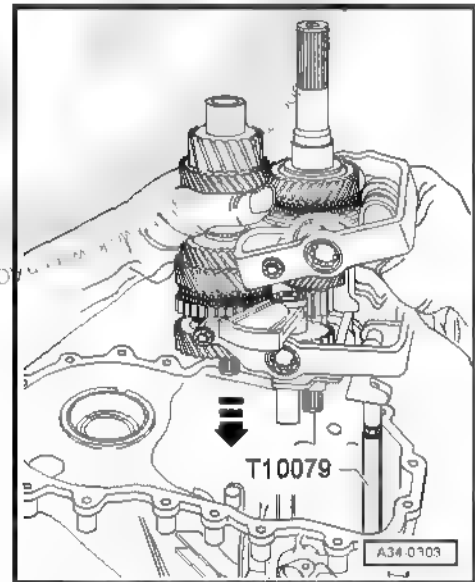




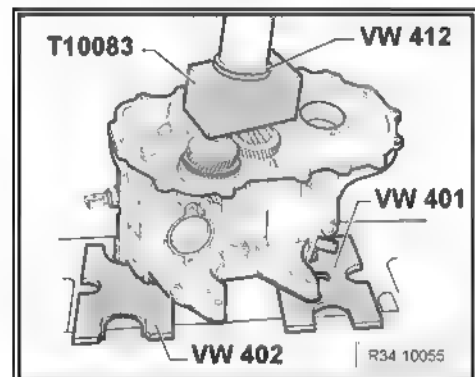
- Install input shaft -2-, and planet pinion -1- with the bearing/ ball bearing mounting on the Pressure base - T 10085- .
- Install the selection mechanism (selector forks) -4- on the shaft engaging sleeves
- Install the reverse gear wheel shaft -3- with gear.
- Install Guide pin - T 10079- on threaded pin (reverse gear fastening) -arrow-.



- Install all the components in the transfer box case, by directing the Guide pin - T 10079- into the case through the gearshift mechanism's supporting hole.
- Remove the Guide pin - T 10079- .
- Before pressing on the roller bearing mounting, check the correct fitting of the selector forks on the gearing sleeves.

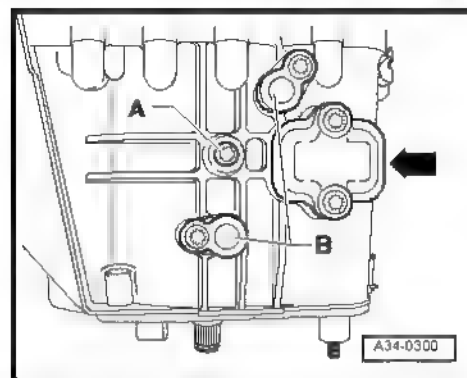


- Press carefully the roller bearing support with the primary and planet pinions to the stop.

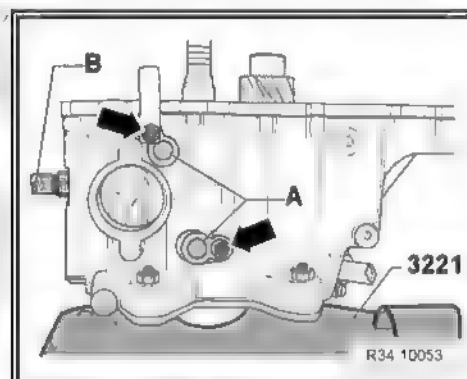




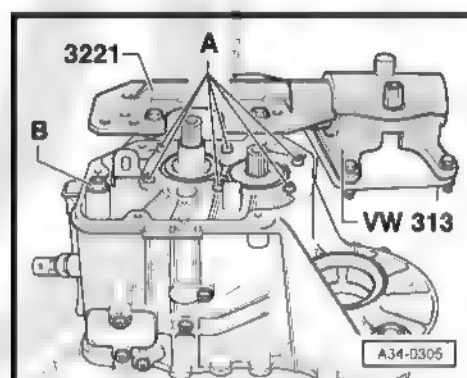
- Install screw -A- on the reverse gear wheel shaft
- Install bearing pins -B- on the lower transmission part



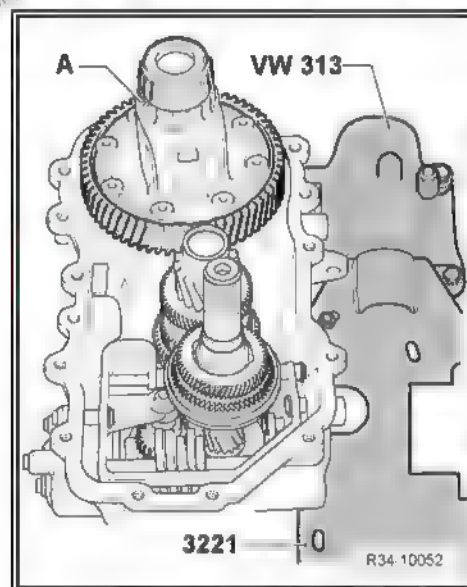
- Install the reverse gear light switch - F4- -B-.
- Install bearing pins -A- on the upper gearbox part.



- Install bearing supports on the primary and planet pinions by using new screws -A- tightening in cross and phased pattern, starting by the middle.
- Install hex nut -B- for the selection mechanism (selector forks).



- Install differential -A-.
- Apply Sealing compound - AMV 188 200 03- evenly over the sealing surface of the gearbox housing.
- Install the clutch housing on the gearbox housing and tighten screws to the specified tightening torque ➔ [Item 3 \(page 76\)](#) .
- Place the gearbox with the clutch housing facing upwards.
- Install the 5th gear wheel -1- with the needle bearing.

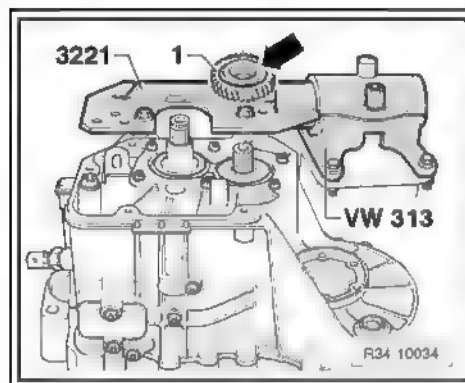




### Installation position for 5th gear wheel

The wide collar -arrow- should point to the gearbox housing cover.

- Install the 5th gear synchronizer ring on the wheel.
- Install the complete 5th gear synchronizer with the gearing sleeve and stop ring.

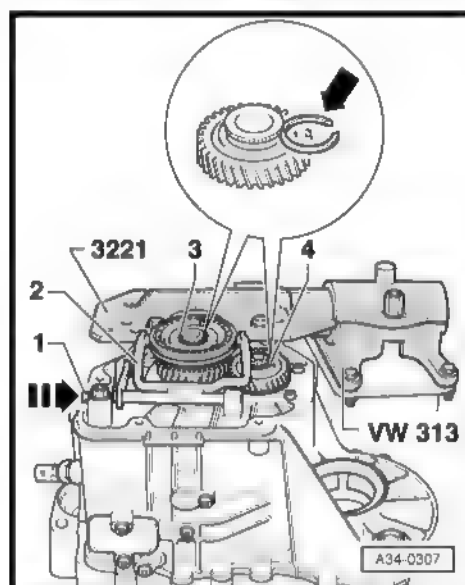


- Install the 5th gear selector fork -2- and push the bearing pin -1- to the stop, towards -arrow-.
- Determine the new circlip thickness -arrow-.
- Identify and install circlip on the primary -3- and pinion -4- shafts.

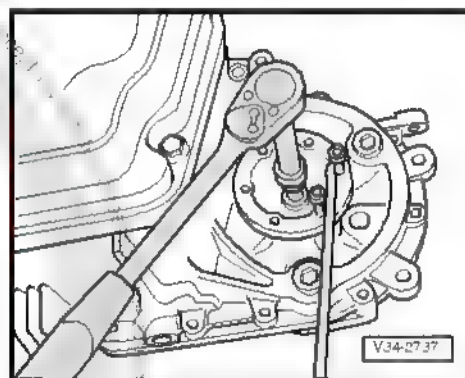
### Available circlips

Thickness (mm)	Replacement parts No.
2.00	-085 311 187-
2.10	-085 311 187 A-
2.20	-085 311 187 B-

- Install the gearbox housing cover.



- Install drive flanges.
- Install clutch lever with bearing and bearing guide ➔ [page 15](#)
- Fill with gear oil ➔ [page 87](#) .





## 7 Gearbox oil level

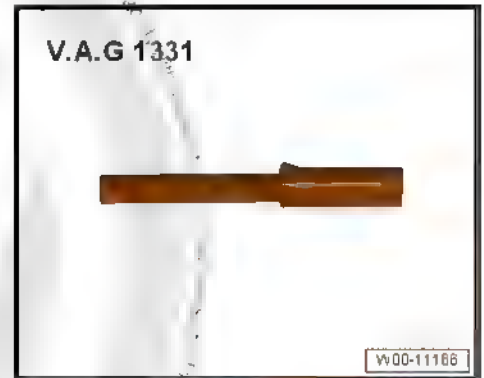
⇒ "7.1 Oil level - check", page 87

→ "7.2 Oil level - replenish", page 87

### 7.1 Oil level - check

Special tools and workshop equipment required

- ◆ Torque wrench - 5 to 50 Nm ( 1/2" drive) - VAG 1331-



Note

*Gearbox oil specification ⇒ page 1*

- Loosen screw (plug) to check oil -arrow-.



Note

*The oil level will be OK if the gearbox has oil up to the lower edge of the checking hole.*

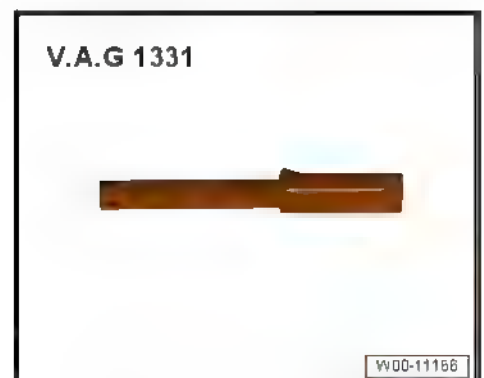
- Install screw (plug) -arrow-. Tightening torque, see  
⇒ Item 3 (page 77) .



### 7.2 Oil level - replenish

Special tools and workshop equipment required

- ◆ Torque wrench - 5 to 50 Nm ( 1/2" drive) - VAG 1331-





To fill completely the reservoir with new oil:



Note

Gearbox oil specification ➔ [page 1](#)

- Loosen screw (plug) -arrow-.
- Fill with the specified oil up to the lower edge of the checking hole.
- Install screw (plug) -arrow-.
- Start engine, engage a gear and let the gearbox operate for approx. 2 minutes.
- Stop engine and replenish the oil up to the lower edge of the checking hole.
- Install screw (plug) -arrow-. Tightening torque, see [Item 3 \(page 77\)](#).







## 8 Gear selector mechanism oil level

→ "8.1 Oil level - check", page 89

→ "8.2 Oil level - replenish", page 90

### 8.1 Oil level - check

Check conditions:

- First, the engine should be turned off.
- At the beginning of the check, the initial oil temperature must not be above 30 °C.
- The gearbox should not be operating.
- The vehicle should be stopped on a horizontal and even surface.
- The selector lever should be in position "N" and the handbrake should be activated.
- To check the oil level in the reservoir, the hydraulic system must be depressurized.



Note

Oil specification for gear selector mechanism ⇒ [page 1](#) .



#### WARNING

*To check the oil level in the reservoir, the hydraulic system must be depressurized.*

In order to perform depressurization of the hydraulic system, it is necessary to use the Vehicle diagnostic, testing and information system .

- Operate the handbrake.
- Position the gear lever in "N".
- Turn vehicle on.
- Connect the Diagnosis, Measurement and Information System ⇒ [page 19](#) .
- Turn on the Vehicle diagnostic, testing and information system and select the operation mode "Assisted troubleshooting".
- Press the **Advance** key and select "Function/component selection" and then the following menu functions:
  - ◆ **Functions**
  - ◆ **Relieve the hydraulic system pressure**
- Remove the air filter behind the Battery- A- ⇒ Engine; Rep. gr. 24 ; Fuel supply - injection system .

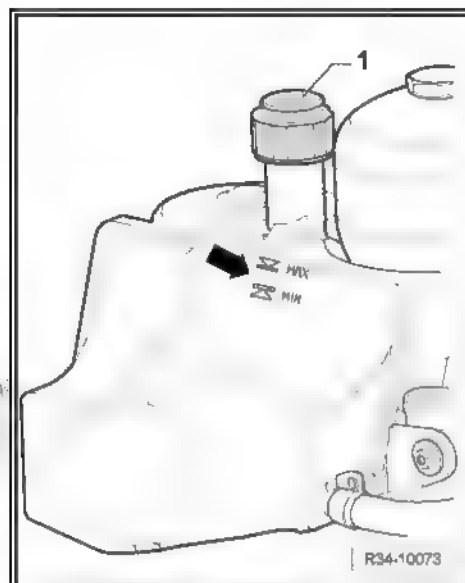


- Remove the reservoir cover -1-.



**Note**

*The oil level should be between the marks identified as "MAX" and "MIN" in the reservoir -arrow-.*



## 8.2 Oil level - replenish

To fill completely the reservoir with new oil:



**Note**

*Oil specification for gear selector mechanism ⇒ [page 1](#).*

- Remove the reservoir cover -1-.
- Fill with oil up to the lower edge of the checking hole (MAX).
- Install the reservoir cover -1-.
- Pressurize the hydraulic system.
- Turn on the engine, engage a gear and check all gear positions.



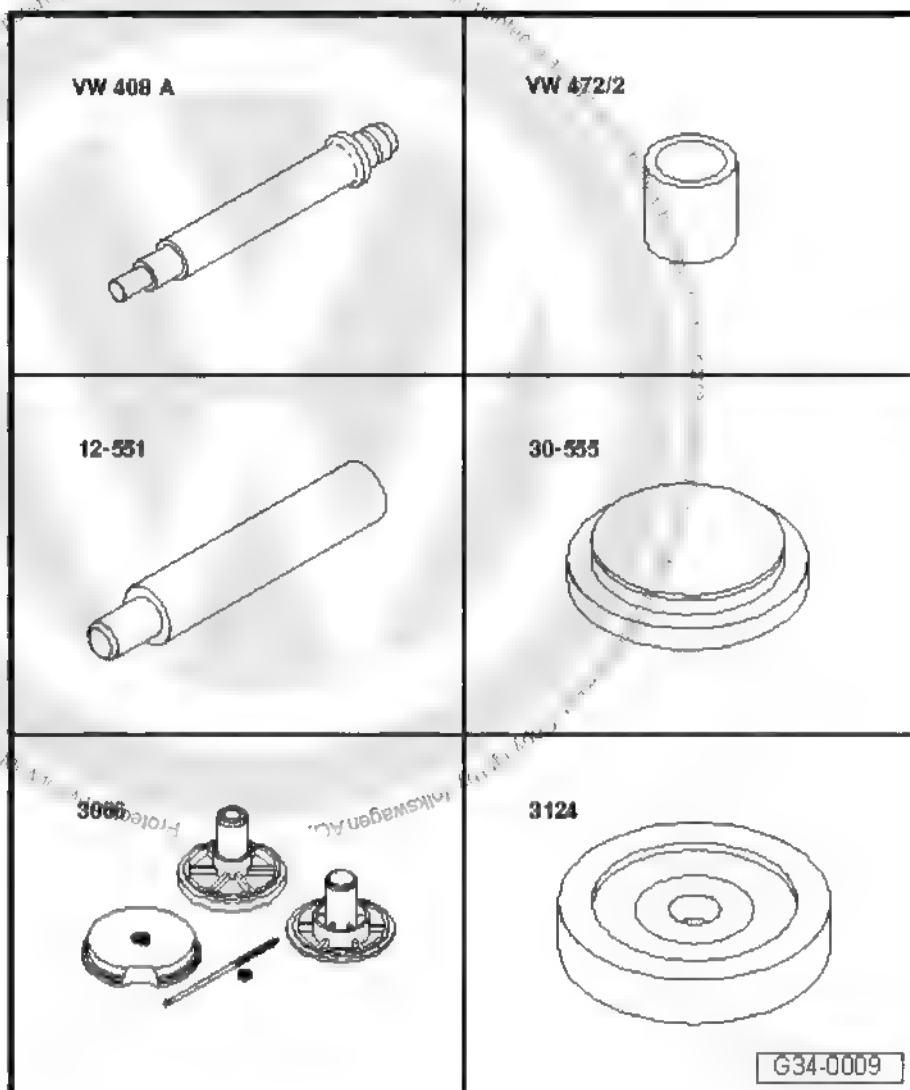


## 9 Gearbox and clutch housings

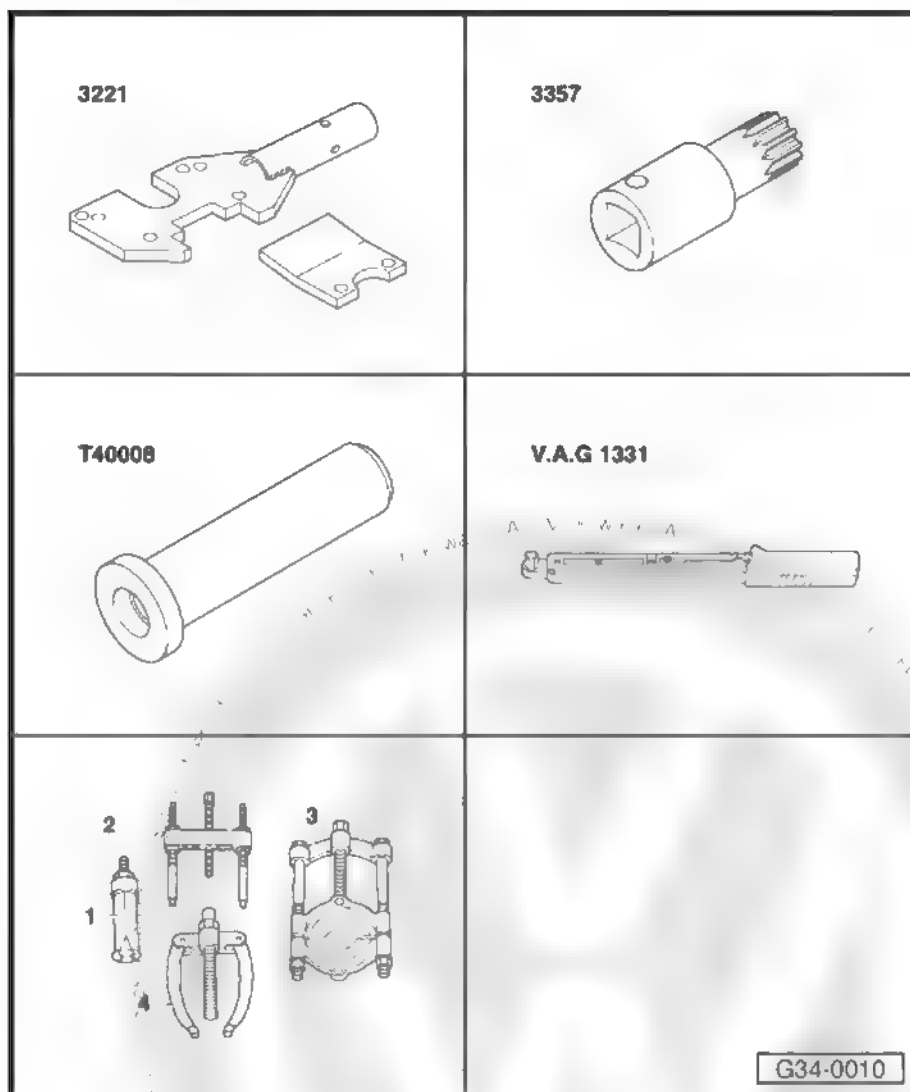
→ "9.1 Transmission and clutch housings - repair", page 91

### 9.1 Transmission and clutch housings - repair

Special tools and workshop  
equipment required



- ◆ Pressure pin - VW 408 A-
- ◆ Sleeve - VW 472/2-
- ◆ Centring pin - 12-551-
- ◆ Pressure disc - 30-555-
- ◆ Assembly device - 3066-
- ◆ Pressure plate - 3124-



- ◆ Mounting bracket - 3221-
- ◆ Multi-tooth socket SW 27 - 3357-
- ◆ Pressure tube - T 40008-
- ◆ Torque wrench - 5 to 50 Nm ( 1/2" drive) - VAG 1331-
- ◆ -2- - Puller 65 - 160 mm - KUKKO 18/1-
- ◆ -3- - Spacer 12 - 75 mm - KUKKO 17/1-



**WARNING**

- ◆ *When handling chemicals follow the safety instructions ⇒ Chemical Products Manual; Rep. gr. 00*
- ◆ *Assignment of Chemical Materials ⇒ Electronic Parts Catalogue "ETKA"*



## 1 - Clutch housing

- ☐ Assignment → Electronic Parts Catalogue "ET-KA".
- ☐ Repair → [page 91](#).
- ☐ Apply Sealing compound - AMV 188 200 03- evenly over the sealing surface of the gear-box housing
- ☐ In case of replacement, always adjust differential → [page 138](#).

## 2 - Ball pin

- ☐ 20 Nm.
- ☐ Lubricate with Lubricating grease - G 000 100-.

## 3 - Sealing ring for input shaft

- ☐ Remove by leveraging with screwdriver.
- ☐ Installation → [page 95](#)

## 4 - Sealing ring for the right drive flange

- ☐ Replace with the gear-box installed → [page 123](#).

## 5 - Bushing

- ☐ For the sealing ring
- ☐ Removal → [page 95](#)
- ☐ Installation → [page 95](#)

## 6 - Oil replenishment screw (plug)

- ☐ 25 Nm.

## 7 - O-ring

- ☐ Replace after each removal.

## 8 - Speed sensor - G22-

- ☐ For vehicles without ABS.

## 9 - Bolt

- ☐ 5 Nm + 90°.
- ☐ Replace after each removal.

## 10 - Cap

- ☐ for vehicles with ABS.

## 11 - Bolt

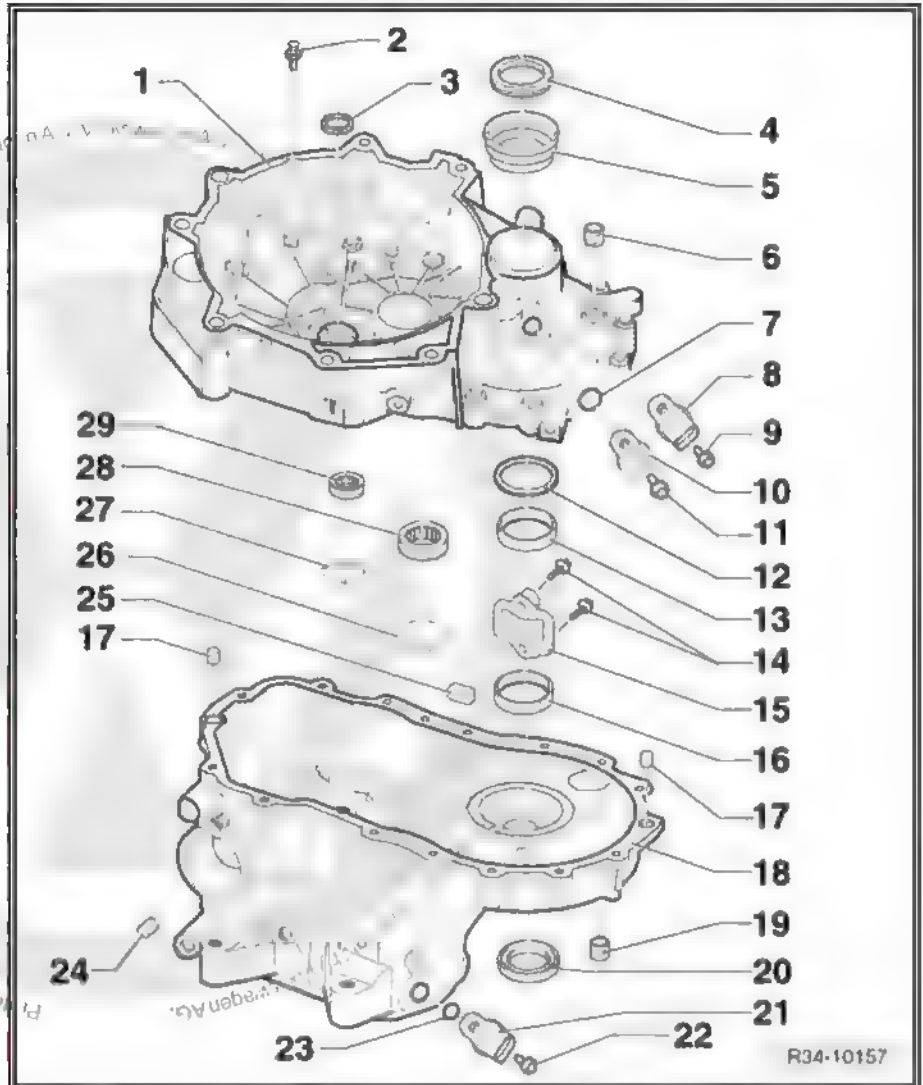
- ☐ 5 Nm + 10°.
- ☐ Replace after each removal.

## 12 - Adjustment shim S<sub>1</sub>

- ☐ For the differential.
- ☐ Determine thickness → [page 138](#).

## 13 - Outer ring on the tapered roller bearing

- ☐ For the differential.
- ☐ Remove → [page 135](#)



R34-10157



- ☐ Install [⇒ page 136](#)
- ☐ Whenever replaced, adjust the differential [⇒ page 138](#) .
- 14 - Bolts
  - ☐ 5 Nm + 90°.
  - ☐ Replace after each removal.
- 15 - Reservoir cap
  - ☐ Apply Sealing compound - AMV 188 200 03- evenly on the **sealing surface** before installing
- 16 - Outer ring on the tapered roller bearing
  - ☐ For the differential.
  - ☐ Removal [⇒ page 136](#)
  - ☐ Installation [⇒ page 136](#)
  - ☐ Whenever replaced, adjust the differential [⇒ page 138](#) .
- 17 - Adjustment pins
  - ☐ 2 units.
- 18 - Gearbox housing
  - ☐ Assignment [⇒](#) Electronic Parts Catalogue "ETKA" .
  - ☐ Repair [⇒ page 91](#) .
  - ☐ Apply Sealing compound - AMV 188 200 03- evenly over the sealing surface of the gearbox housing.
  - ☐ In case of replacement, always adjust differential [⇒ page 138](#) .
- 19 - Oil draining screw (plug)
  - ☐ 25 Nm.
- 20 - Sealing ring for the left drive flange
  - ☐ Replace with the gearbox installed [⇒ page 123](#) .
- 21 - Gearbox input speed sensor - G182-
  - ☐ Remove and install [⇒ page 23](#)
- 22 - Bolt
  - ☐ 5 Nm + 90°.
  - ☐ Replace after each removal.
- 23 - O-ring
  - ☐ Replace after each removal.
- 24 - Bushing
  - ☐ For the axle selector set.
  - ☐ Removal [⇒ page 95](#)
  - ☐ Installation [⇒ page 96](#)
- 25 - Magnet
  - ☐ Fastened on the case surface.
- 26 - Circlip
  - ☐ Install on the tapered roller bearing groove [⇒ Item 28 \(page 94\)](#) .
- 27 - Circlip
  - ☐ Install on the tapered roller bearing groove [⇒ Item 29 \(page 94\)](#) .
- 28 - Tapered roller bearing
  - ☐ For planet pinion.
  - ☐ Removal [⇒ page 118](#)
  - ☐ Installation [⇒ page 118](#)
- 29 - Tapered roller bearing
  - ☐ For input shaft.

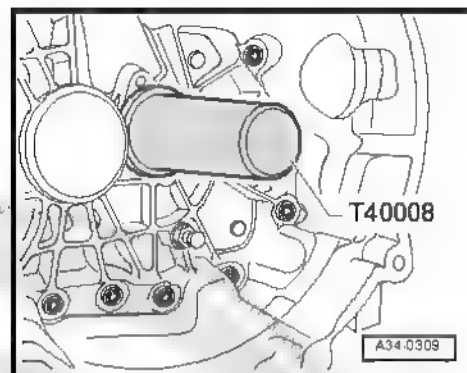




- ❑ Removal ➔ [page 108](#)
- ❑ Installation ➔ [page 108](#)

#### Installing the input shaft's sealing ring

- Install sealing ring using the Pressure tube - T 40008- .

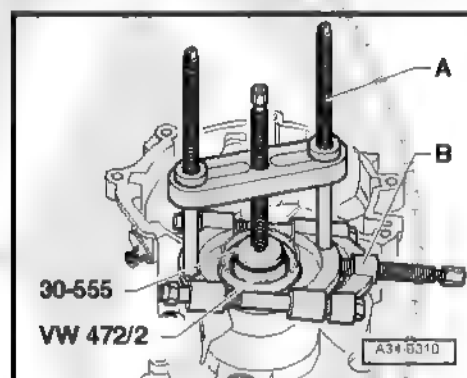


#### Removing the sealing ring bushing

- Sleeve - VW 472/2- and Pressure disc - 30-555- , install on the differential.

A - 65 - 160 mm puller - KUKKO 18/1-

B - 12 - 75 mm separator - KUKKO 17/1-



#### Installing the sealing ring bushing

A - Fasten the threaded shaft of the Assembly tool - 3066- to the threaded part in the differential.

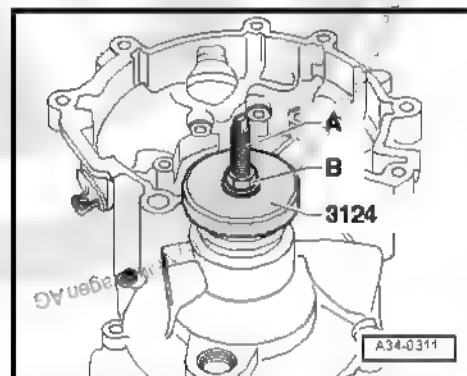
B - M12 nut with washer.

- Install the bushing to the stop with Thrust plate - 3124- by turning nut -B-.

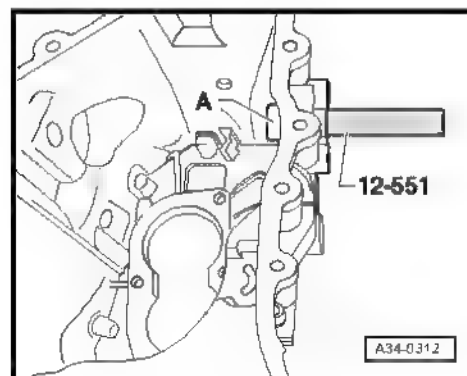


#### Note

*With the gearbox disassembled, press the bushing with Thrust plate - 3124- to the stop.*

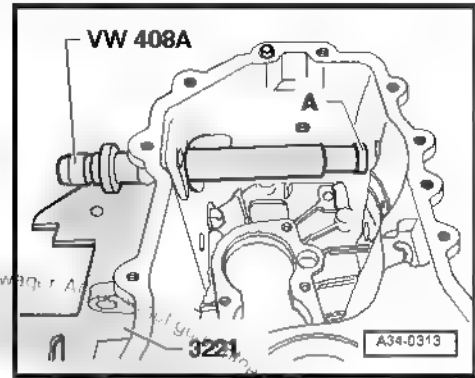


#### Removing the bushing for the selector lever shaft -A-





Installing the bushing for the selector lever shaft -A-



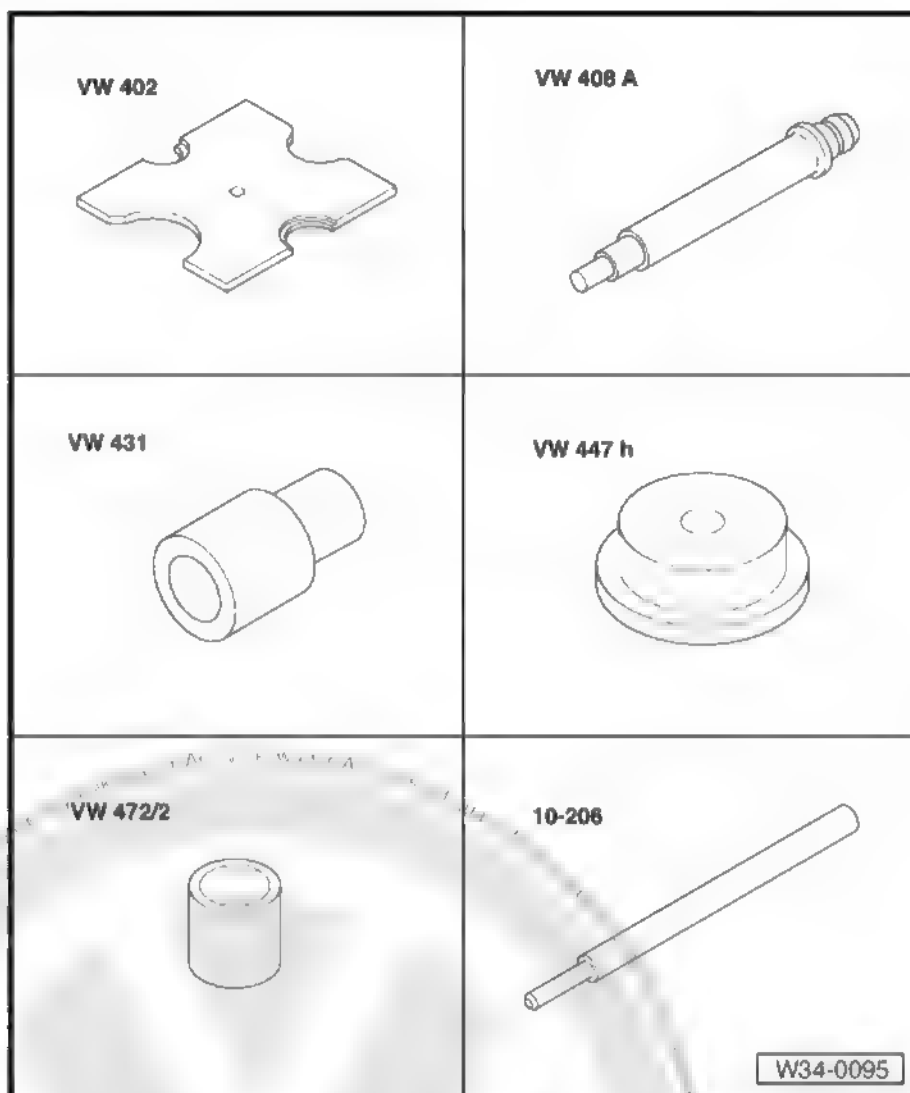


## 10 Selector forks

➔ "10.1 Selector forks - disassemble and assemble", page 97

### 10.1 Selector forks - disassemble and assemble

Special tools and workshop  
equipment required



- ◆ Plate - VW 402-
- ◆ Pressure pin - VW 408A-
- ◆ Pressure base - VW 431-
- ◆ Pressure base - VW 447H-
- ◆ Sleeve - VW 472/2-
- ◆ Pin or VW 010-206 - 10-206-



80-200



W00-11156

◆ Removal lever - 80-200-



Note

To remove or install the selector segments (skids), circlips and ball bearings, you are not required to remove the change rail set  
⇒ [Item 1 \(page 99\)](#).



**1 - Change rail set with selector forks**

**2 - Selector segment of 3rd / 4th gears**

- ☐ Identification ➤ [page 100](#)
- ☐ After assembling, it should move freely.
- ☐ Individual selector segments are mounted in some gearboxes ➤ [page 100](#)
- ☐ Identification of individual segments ➤ [page 100](#)

**3 - Ball bearing**

- ☐ 4 units.
- ☐ Removal ➤ [page 101](#)
- ☐ Installation ➤ [page 101](#)

**4 - Circlip**

- ☐ Replace after each removal.
- ☐ Removal ➤ [page 101](#)
- ☐ Installation ➤ [page 101](#)

**5 - Selector segment of 1st / 2nd gears**

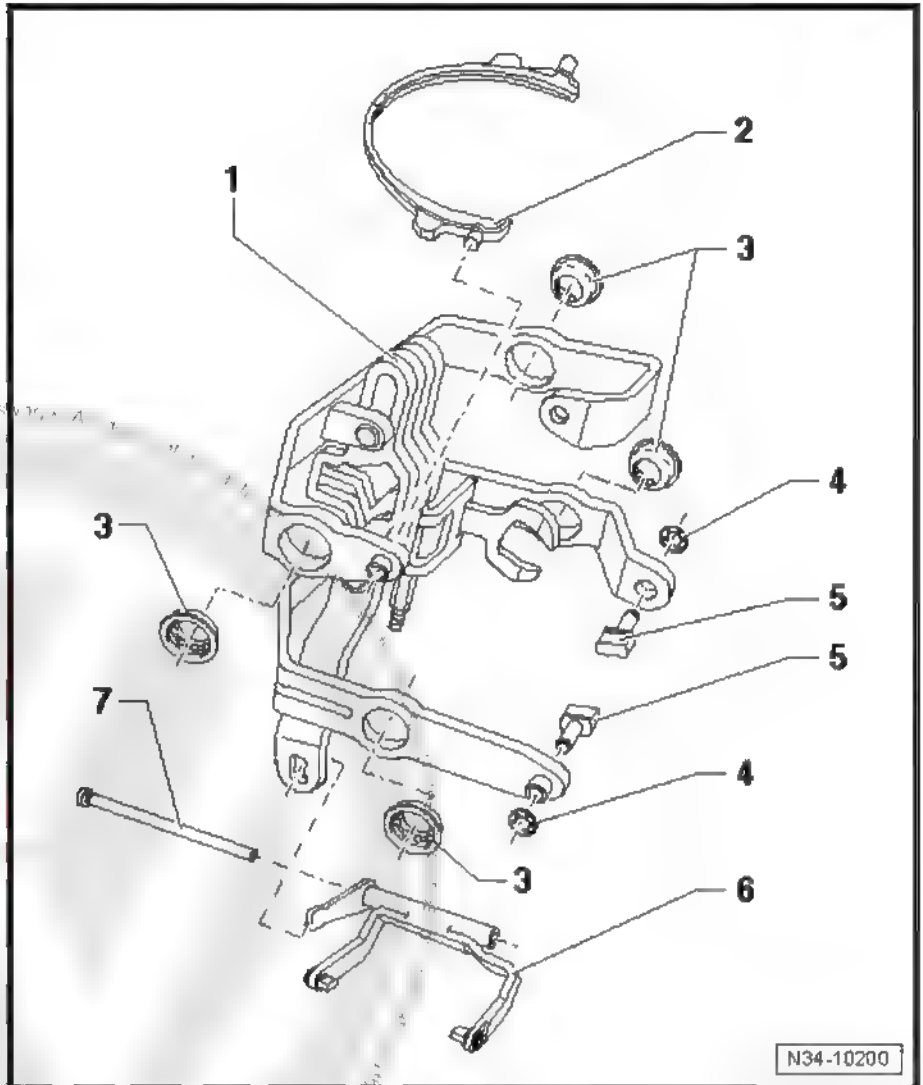
- ☐ Identification ➤ [page 100](#)
- ☐ After assembling, it should move freely.

**6 - 5th gear selector fork with selector segment**

- ☐ The selector segments should not be removed from the selector fork.
- ☒ Identification ➤ [page 100](#)

**7 - Bearing pin**

- ☐ For the selector fork for 5th gear.

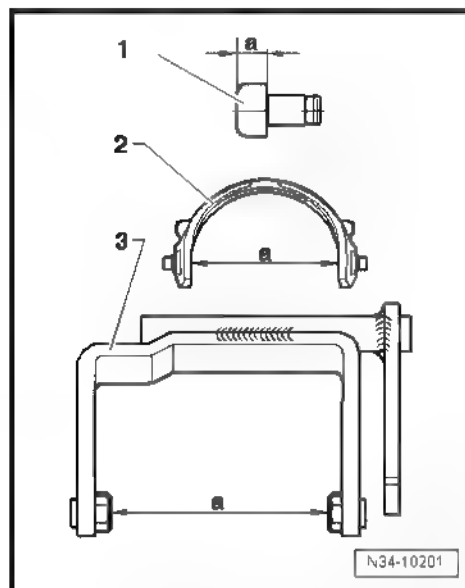




Identification of the selector segments of the 5th gear selector fork, including the selector segments of the 1st / 2nd gears and 3rd / 4th gears

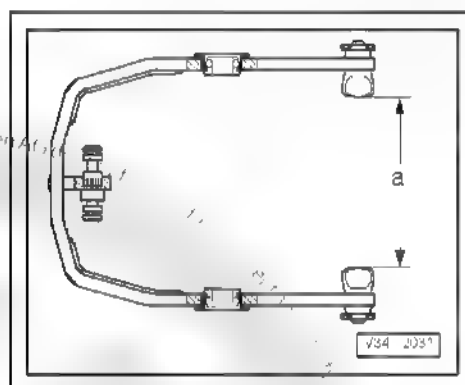
Dimension -a-:

- 1 - Selector segments of 1st / 2nd gears = 10 2 mm
- 2 - Selector segments of 3rd / 4th gears = 78.6 mm
- 3 - Selector fork for 5th gear, including the selector segments = 79 5 mm



Selector fork for 1st/2nd gears, including the selector segments

Dimension -a- = 75 mm.



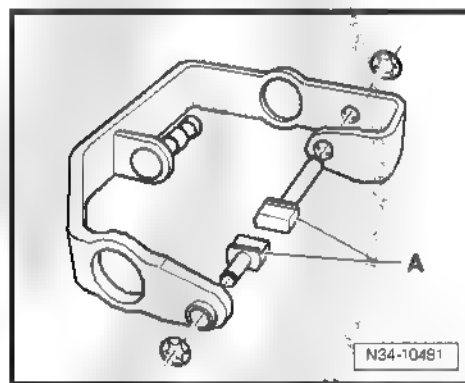
Individual selector segments of 3rd / 4th gear -A-

After assembling the gear selector segments, they should move freely.



Note

Only some transmissions have these individual segments.



Identification of the individual selector segments of the 3rd / 4th gears

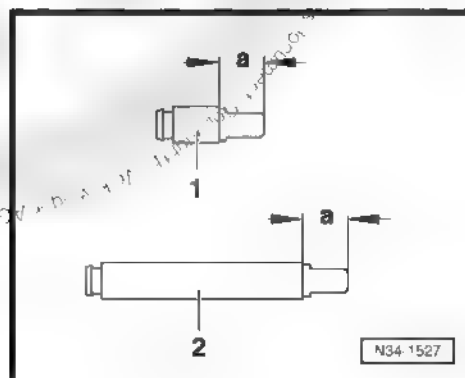
Dimension -a-:

- 1 - Short selector segment of 3rd / 4th gears = 10 2 mm
- 2 - Long selector segment of 3rd / 4th gears = 78.6 mm



Note

When removing or installing internal tracks, do not twist the selector forks.





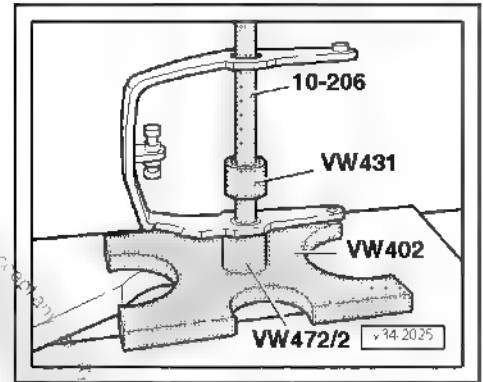


## Removing ball bearing

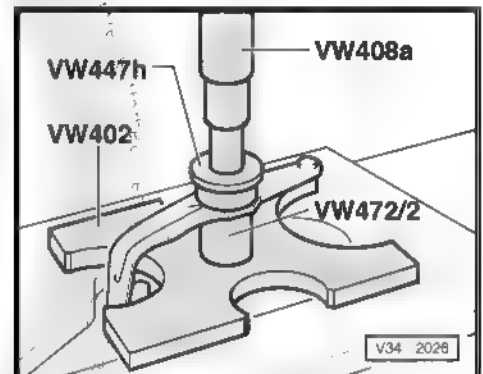


### Note

*When removing or installing internal tracks, do not twist the selector forks.*

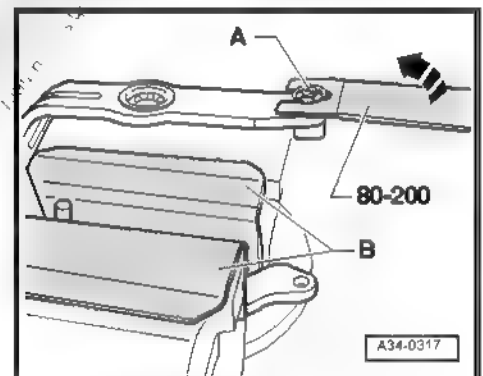


## Installation ball bearing



## Removing circlip

- Fasten the selector forks to the vice with jaw -B-.
- Remove circlip -A- by leveraging towards -arrow-.



## Installing circlip

A - Barrel wrench 10

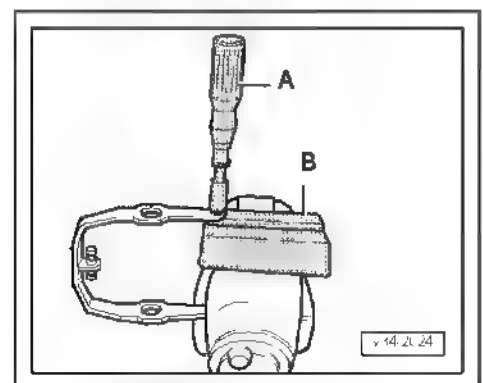
B - Jaw

- Press the circlip on the fork segment groove by using a barrel wrench.



### Note

*After installing the circlip, the fork segment shall move freely.*





## 35 – Gears, shafts

### 1 Input shaft

→ "1.1 Primary shaft - general overview of assembly", page 102

→ "1.2 Input shaft - disassemble and assemble", page 105

#### 1.1 Primary shaft - general overview of assembly



##### WARNING

- ◆ When handling chemicals follow the safety instructions ⇒ Chemical Products Manual; Rep. gr. 00
- ◆ Assignment of Chemical Materials ⇒ Electronic Parts Catalogue "ETKA"



##### Note

- ◆ When installing new gears, refer to technical data ⇒ page 1.
- ◆ Install all the roller bearings, gears and synchronizer rings on the input shaft, lubricated with gear oil.
- ◆ Do not invert the synchronizer rings. When reusing synchronizer rings, always install them on the same gear pair.



# 1 - Circlip

- ☐ Replace after each removal.
- ☐ Determine thickness ➔ [page 86](#) .

## 2 - Engaging sleeve with 5th gear synchronizer

- ☐ Disassemble and assemble ➔ [page 112](#)

## 3 - Synchronizer ring for 5th gear

- ☐ Wear check ➔ [page 110](#)

## 4 - 5th gear wheel

## 5 - Needle bearing

- ☐ For 5th gear.
- ☐ Change with bushing ➔ [Item 6 \(page 103\)](#) .

## 6 - Bushing

- ☐ For 5th gear needle bearing.
- ☐ Change with roller bearing ➔ [Item 5 \(page 103\)](#) .
- ☐ Remove with ball bearing support ➔ [page 108](#)
- ☐ Installation ➔ [page 111](#)

## 7 - Gearbox housing

- ☐ Assignment ➔ Electronic Parts Catalogue "ET-KA" .

- ☐ Repair ➔ [page 91](#) .

- ☐ Apply Sealing compound - AMV 188 200 03- evenly over the sealing surface of the gearbox housing.

- ☐ In case of replacement, always adjust differential ➔ [page 138](#) .

## 8 - Roller bearing support with ball bearing

- ☐ Check and replace whenever damaged.
- ☐ Clean the threaded holes of the roller bearing support (e.g. Tap M6).
- ☐ Removal ➔ [page 108](#)
- ☐ Installation ➔ [page 111](#)

## 9 - Input shaft

## 10 - Needle bearing

- ☐ For 3rd gear.

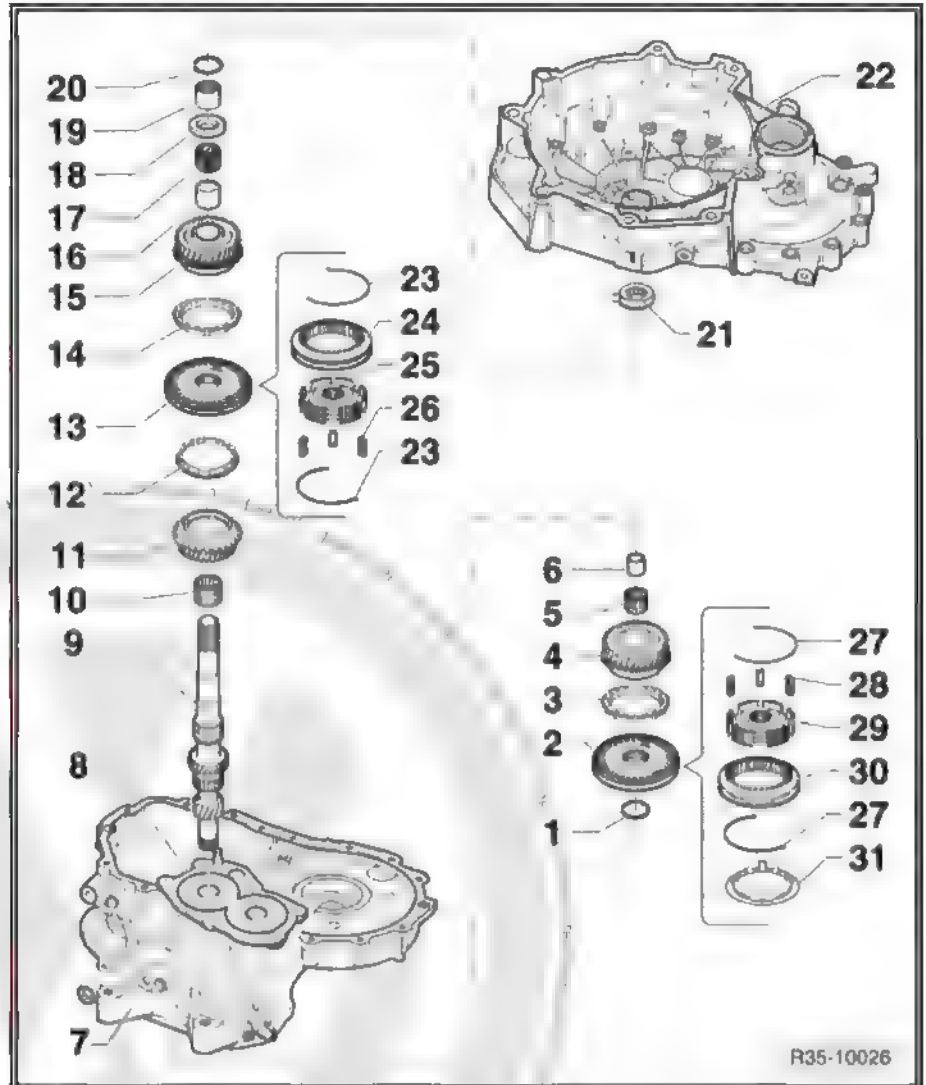
## 11 - 3rd gear wheel

## 12 - Synchronizer ring for 3rd gear

- ☐ Wear check ➔ [page 110](#)

## 13 - Engaging sleeve with 3rd and 4th gear synchronizer

- ☐ Remove with 3rd gear wheel ➔ [page 109](#)
- ☐ Disassemble and assemble ➔ [page 109](#)
- ☐ Installation position of the engaging sleeve/synchronizer ring ➔ [page 109](#)
- ☐ Installation ➔ [page 110](#)





14 - Synchronizer ring for 4th gear

- ☐ Wear check ➔ [page 110](#)

15 - 4th gear wheel

16 - Bushing

- ☐ For 4th gear needle bearing.
- ☐ Change with needle roller bearing ➔ [Item 17 \(page 104\)](#) .
- ☐ Remove with 3rd gear wheel ➔ [page 108](#)
- ☐ Installation ➔ [page 110](#)

17 - Needle bearing

- ☐ For 4th gear
- ☐ Change with bushing ➔ [Item 16 \(page 104\)](#)

18 - Sealing washer

19 - Inner ring on the tapered roller bearing

- ☐ Removal ➔ [page 108](#)
- ☐ Installation ➔ [page 110](#)

20 - Circlip

- ☐ Replace after each removal.
- ☐ Thickness determination ➔ [page 111](#)

21 - Tapered roller bearing

- ☐ With circlip.
- ☐ Removal ➔ [page 108](#)
- ☐ Installation ➔ [page 108](#)
- ☐ Installation position: the roller bearing circlip should face the input shaft.

22 - Clutch housing

- ☐ Assignment ➔ Electronic Parts Catalogue "ETKA"
- ☐ Repair ➔ [page 91](#) .
- ☐ Apply Sealing compound - AMV 188 200 03- evenly over the sealing surface of the gearbox housing.
- ☐ In case of replacement, always adjust differential ➔ [page 138](#) .

23 - Spring

- ☐ Installation position ➔ [page 109](#)

24 - Engaging sleeve for 3rd and 4th gears

25 - Synchronizer for 3rd and 4th gears

26 - Retainers

- ☐ 3 units.

27 - Spring

- ☐ Installation position ➔ [page 112](#)

28 - Retainers

- ☐ 3 units

29 - Synchronizer for 5th gear

30 - Engaging sleeve for 5th gear

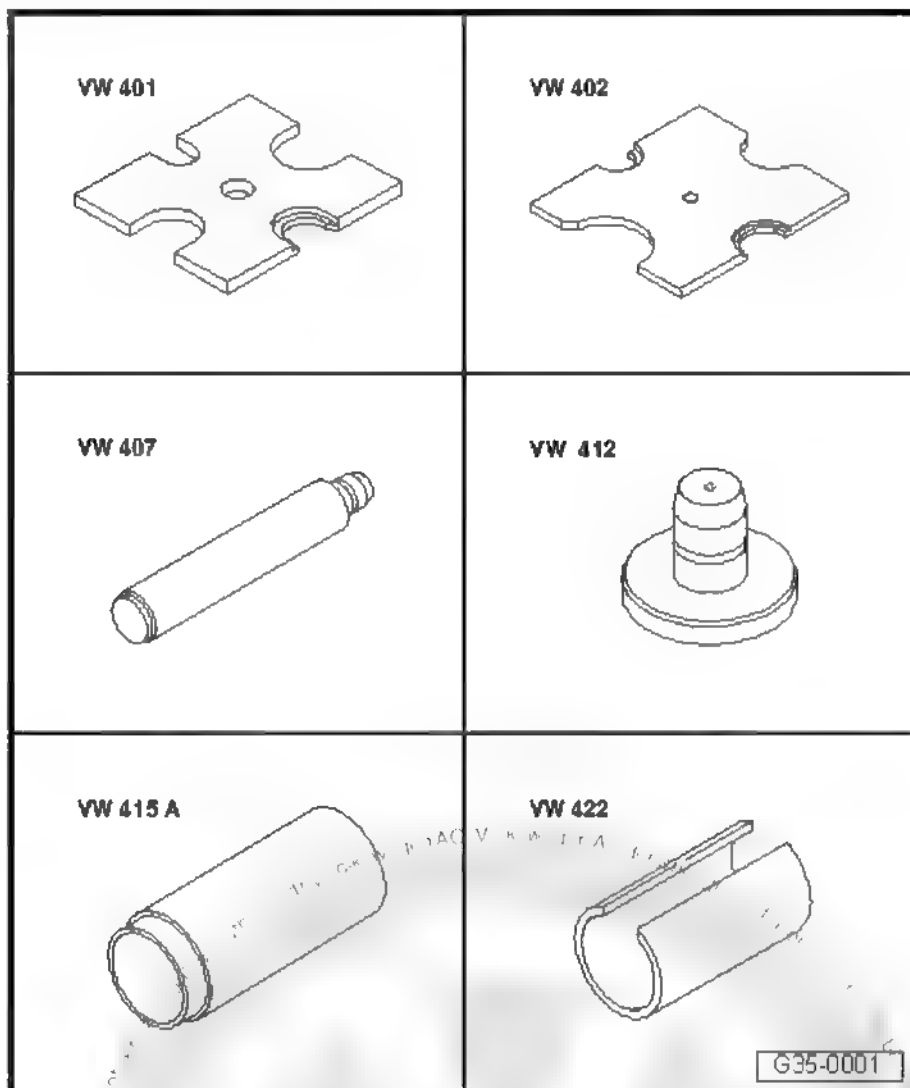
31 - Stop ring

- ☐ Prevent limiter "escape".
- ☐ Removal ➔ [page 112](#)
- ☐ Installation ➔ [page 113](#)

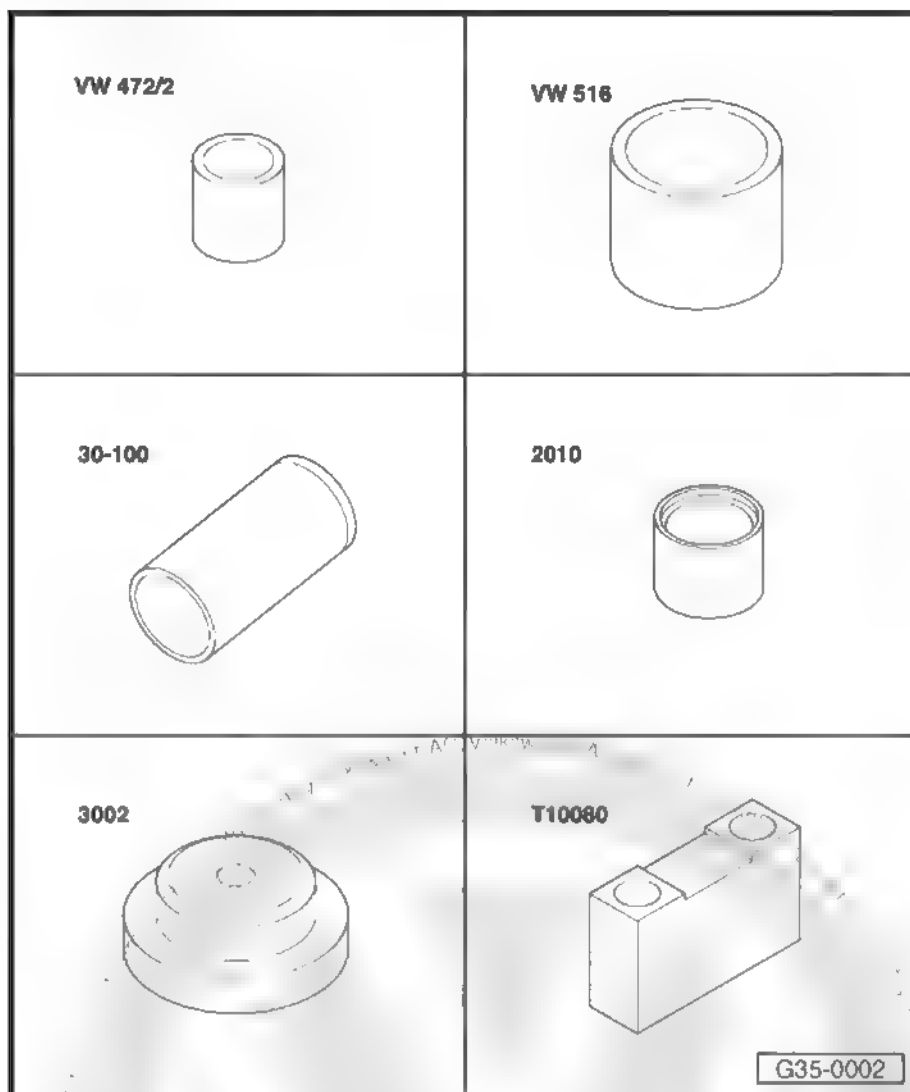


## 1.2 Input shaft - disassemble and assemble

Special tools and workshop  
equipment required

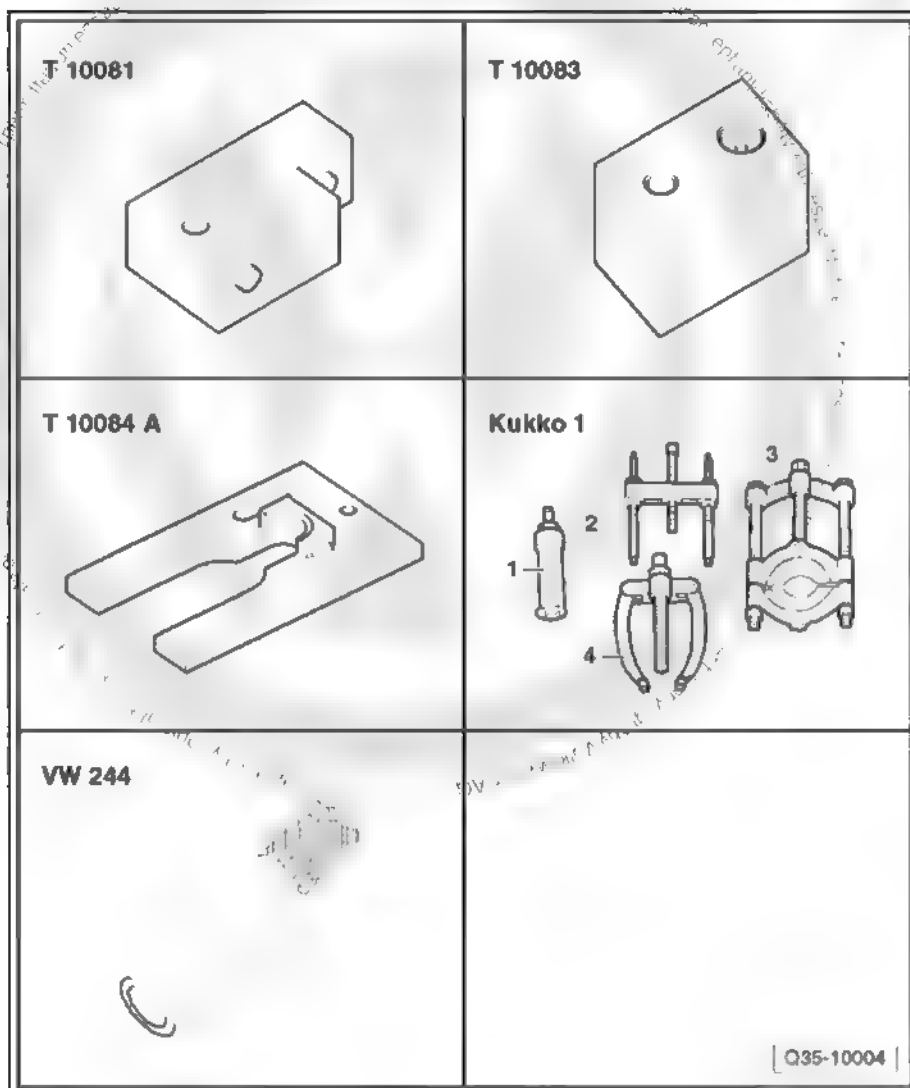


- ◆ Plate - VW 401-
- ◆ Plate - VW 402-
- ◆ Pressure pin - VW 407-
- ◆ Pressure disc - VW 412-
- ◆ Pressure tube - VW 415 A-
- ◆ Pressure tube - VW 422-



- ◆ Sleeve - VW 472/2-
- ◆ Tube - VW 516-
- ◆ Tube - 30-100-
- ◆ Tube - 2010-
- ◆ Pressure base or VW 3002 - 3002-
- ◆ Pressure shim - T 10080-





- ◆ Pressure shim - T 10081-
- ◆ Pressure shim - T 10083-
- ◆ Pressure plate - T 10084 A-
- ◆ -1- 30 - 37mm Puller or VW 020P - Kukko 21/5-
- ◆ -2- - Puller 65 - 160 mm - KUKKO 18/1-
- ◆ -3- - Spacer 12 - 75 mm - KUKKO 17/1-
- ◆ -4- Auxiliary support - KUKKO 22/1-
- ◆ Fitting tool - VW 244-

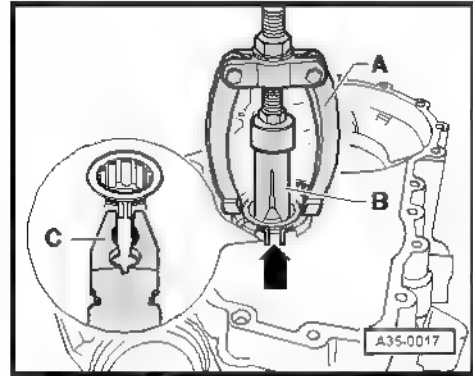


### Removing tapered roller bearing on clutch housing

A - Auxiliary support - KUKKO 22/1- .

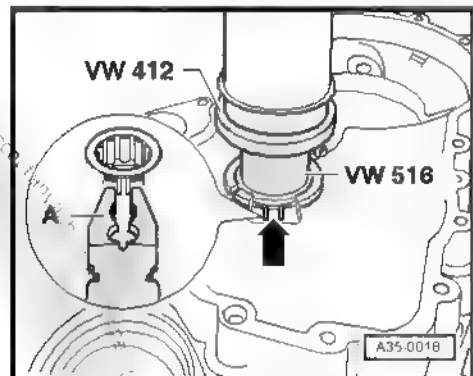
B - Puller 30 - 37mm or VW 020P - Kukko 21/5-

- When removing it, compress the bearing circlip -arrow- with pliers -C-.



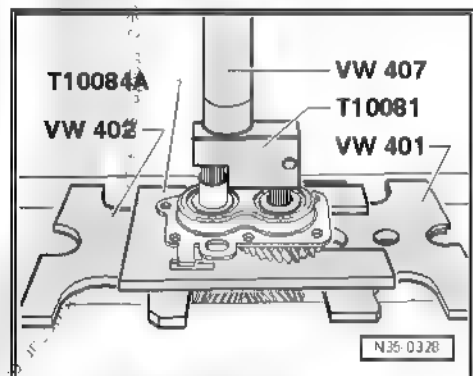
### Installing tapered roller bearing on clutch housing

- Support the clutch housing by placing the Pressure pipe VW 415 A- (not shown in fig.) directly under the bearing support.
- When installing, compress the bearing circlip -arrow- with pliers -A-.
- Remove the pliers just before the bearing is in the correct installation position. The circlip shall be locked in the clutch housing hole.



### Removing the bearing support with ball bearings

- Place the car in 2nd gear.
- Push Thrust plate - T 10084A- laterally to the input shaft stop.
- Install the centralizing pins of the Pressure shim - T 10081- in the orifices of the input and output shafts.



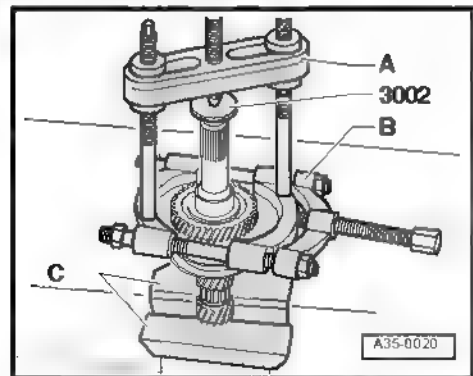
### Removing the inner ring of the tapered roller bearing with the 4th gear wheel

A - 65 - 160 mm puller - KUKKO 18/1-

B - 12 - 75 mm separator - KUKKO 17/1-

C - Protection shims

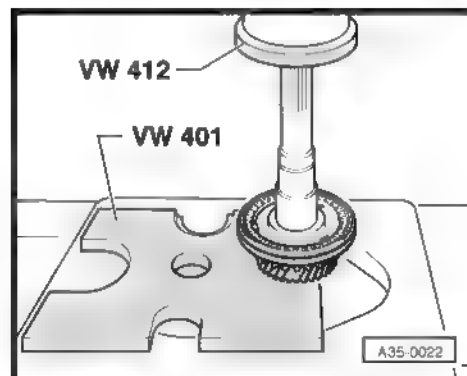
- Remove circlip first.
- Fasten the Spacer 12 - 75 mm - KUKKO 17/1- -B- behind the helical teeth (not in the gear teeth) of 4th gear.





### Removal of engaging sleeve with 3rd and 4th gear synchronizer

- After removing the circlip, disengage together the moving gear of the 3rd gear and the engaging sleeve with the synchronizer.

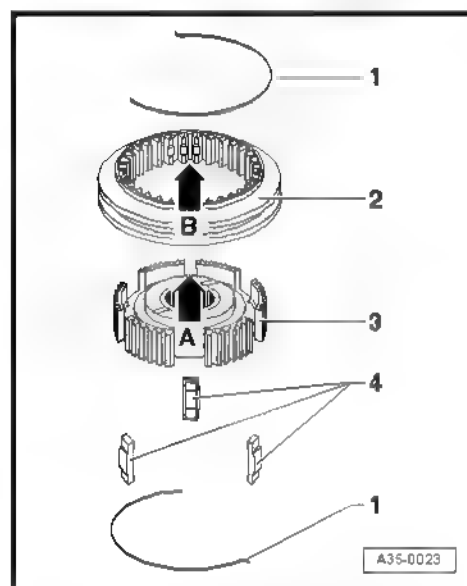


### Disassembling and assembling the engaging sleeve and the 3rd and 4th gear synchronizer

- 1 - Spring
- 2 - Engaging sleeve
- 3 - Synchronizer
- 4 - Retainers

- Press the engaging sleeve on the synchronizer.

The deeper grooves -arrow A- for the limiters located on the synchronizer should match the grooves -arrow B- on the engaging sleeve.



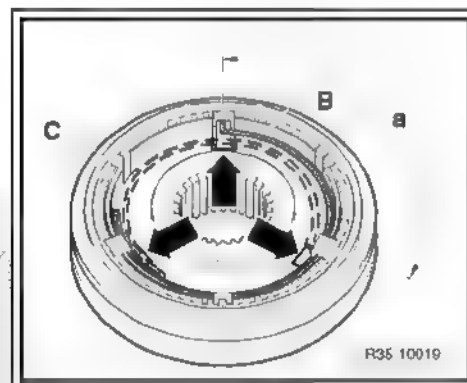
- Install the retainers in the deeper grooves -arrows-.
- Press the engaging sleeve on the synchronizer.
- Install springs -B- and -C- displaced by -a-.



Note

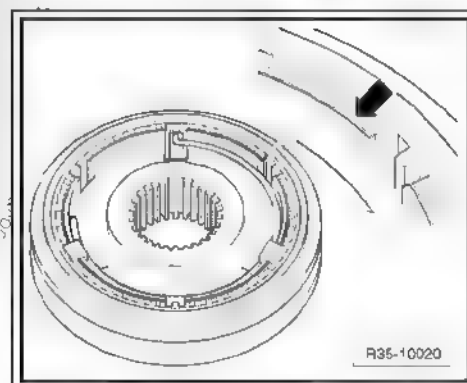
$\alpha = 120^\circ$

- The folded end of the spring should fit into the limiter's hole.



### Installation position of the 3rd and 4th gear engaging sleeve/synchronizer

The front face notch -arrow- should face the 4th gear side

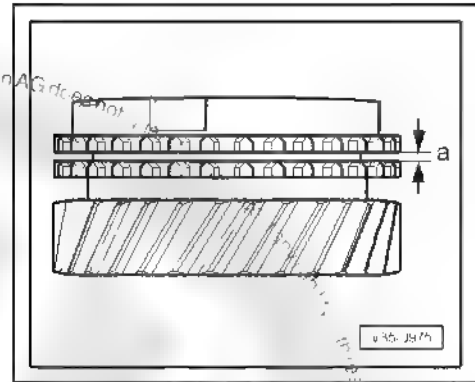




#### Checking the wear on the synchronizer ring

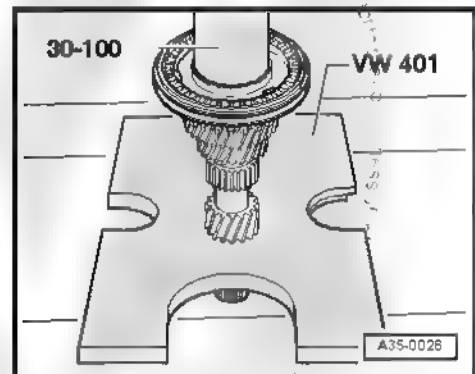
- Press the synchronizer ring against the gear cone and measure the distance -a- with feeler gauge

Distance -a-	New part	Wear limit
3rd, 4th and 5th gears	1.1. 1.7 mm	0.5 mm



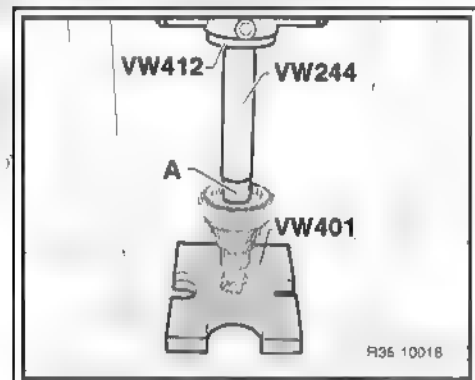
#### Installation of the synchronizer with the 3rd and 4th gear engaging sleeve

- When pressing, secure the 3rd gear wheel with the synchronizer ring fitted in the 3rd and 4th engaging sleeve/synchronizer

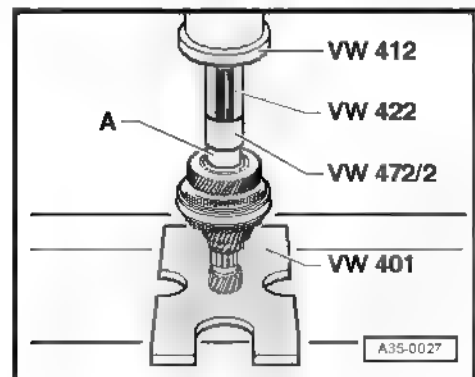


#### Installing the bushing on the needle bearing of 4th gear -A-

- Install 4th gear wheel.



#### Installation of the inner ring on the tapered roller bearing -A-





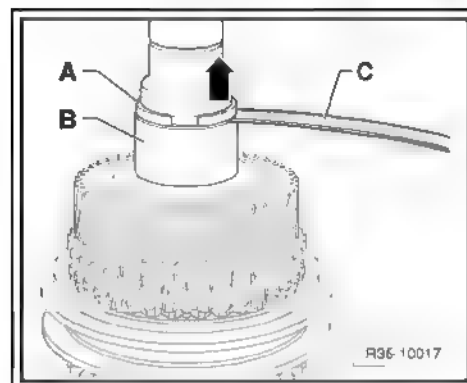
### Determination of the circlip thickness

- Install a circlip with 2.0 mm thickness -A- in the input shaft groove and press upwards -arrow-.
- Determine the distance between the inner ring -B- and the circlip installed -A- by using a feeler gauge -C-.
- Remove the circlip used for measurement
- Use the table to determine the circlip to be installed.



#### Note

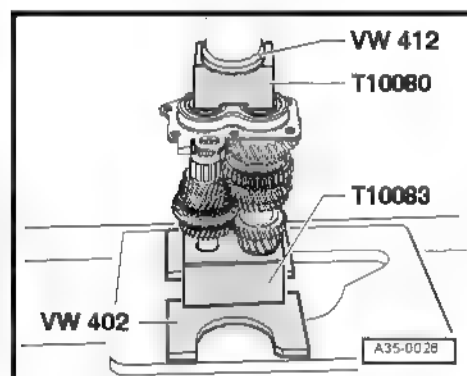
Consult the circlips ⇒ *Electronic Parts Catalogue "ETKA"*.



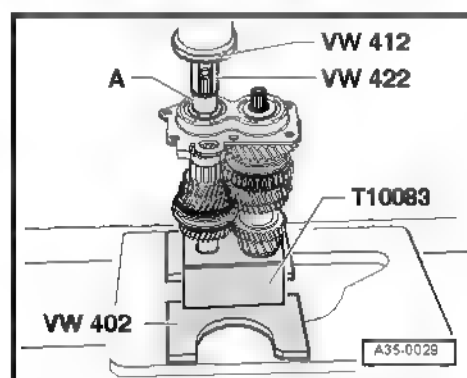
### Available circlips:

Value measured (mm)	Circlip thickness (mm)	Axial clearance (mm)
0,05 ... 0,10	2.0	0,05 ... 0,15
0,15 ... 0,20	2.1	0,05 ... 0,15
0,25 ... 0,30	2.2	0,05 ... 0,15
0,35 ... 0,40	2.3	0,05 ... 0,15
0,45 ... 0,50	2.4	0,05 ... 0,10

### Installing the bearing support with ball bearings



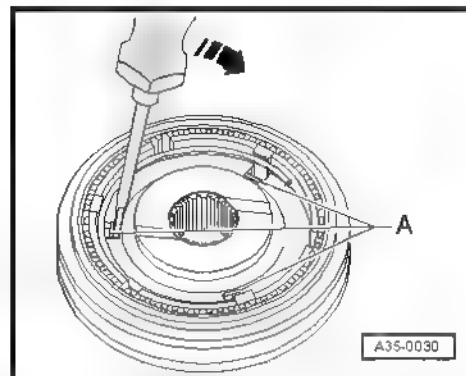
### Installing the bushing -A- for the needle bearing of 5th gear





### Removing the stop ring

- Disengage hooks -A- from the stop ring with a screwdriver



### Disassembling and assembling the 5th gear engaging sleeve and synchronizer

1 - Spring

2 - Retainers

3 - Synchronizer

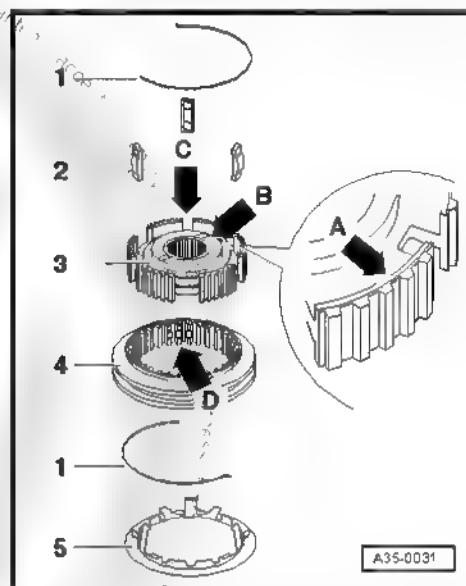
- Installation position: the front face notch -arrow A- and the wide collar -arrow B- should face the 5th gear.

4 - Engaging sleeve

5 - Stop ring

- Press the engaging sleeve on the synchronizer.

The deeper grooves -arrow C- for the limiters located on the synchronizer should match the grooves -arrow D- on the engaging sleeve.



- Install the retainers in the deeper grooves -arrows-.

- Press the engaging sleeve on the synchronizer

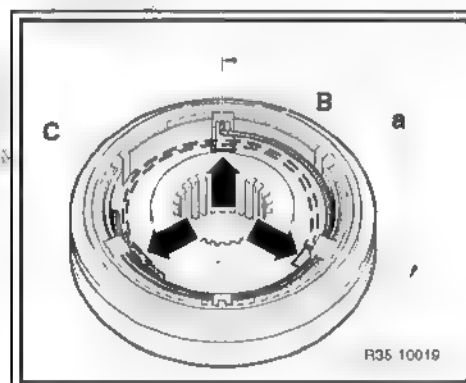
- Install springs -B- and -C- displaced by -a-



Note

-a- = 120°.

- The folded end of the spring should fit into the limiter's hole.

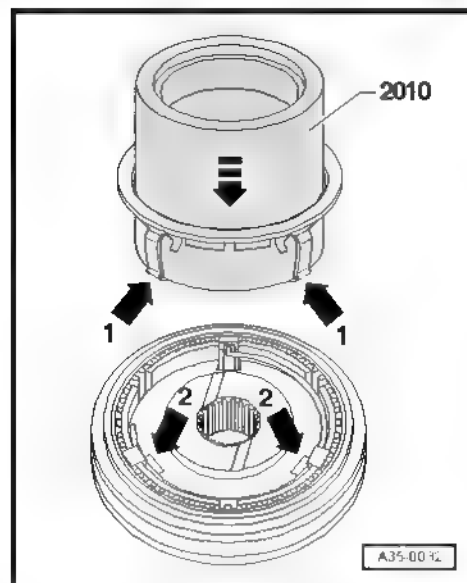






#### Installing stop ring

- Fit the ring in Tube - 2010- .
- Introduce the Tube - 2010- with the 5th gear synchroniser ring, observing the correct installation position. The hooks -arrow 1- should fit in the notches -arrow 2- of the synchronizer limiters
- Press the stop ring downwards until locking the hooks.





## 2 Planet pinion

⇒ "2.1 Pinion shaft - general overview of assembly", page 114

⇒ "2.2 Planet pinion - disassemble and assemble", page 117

### 2.1 Pinion shaft - general overview of assembly



#### WARNING

- ◆ When handling chemicals follow the safety instructions ⇒ Chemical Products Manual; Rep. gr. 00
- ◆ Assignment of Chemical Materials ⇒ Electronic Parts Catalogue "ETKA"



#### Note

- ◆ When installing new gears or a new planet pinion, refer to technical data ⇒ [page 1](#).
- ◆ Install all the roller bearings, gears and synchronizer rings on the input shaft, lubricated with gear oil.
- ◆ Do not invert the synchronizer rings. When reusing synchronizer rings, always install them on the same gear pair.



### 1 - Clutch housing

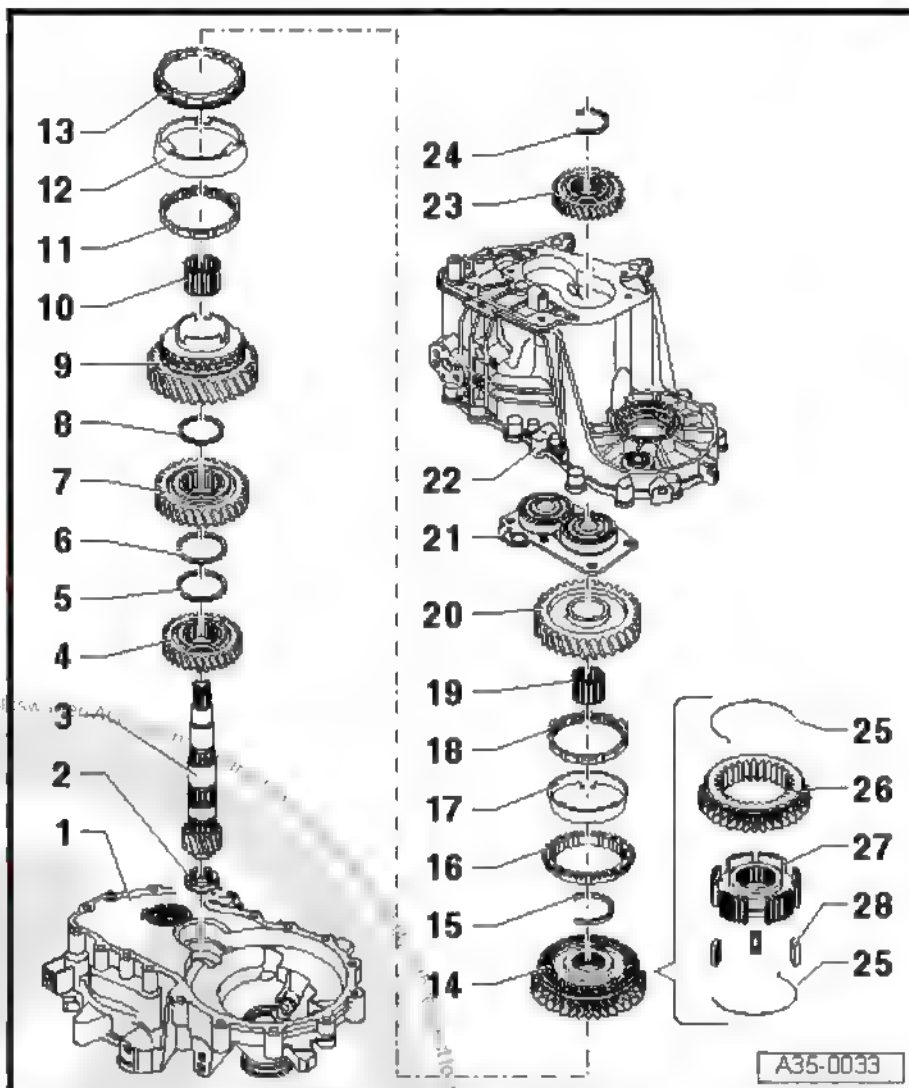
- ☐ Assignment ➤ Electronic Parts Catalogue "ET-KA".
- ☐ Repair ➤ [page 91](#).
- ☐ Apply Sealing compound - AMV 188 200 03- evenly over the sealing surface of the gear-box housing.
- ☐ In case of replacement, always adjust differential ➤ [page 138](#).

### 2 - Tapered roller bearing

- ☐ With circlip.
- ☐ Removal ➤ [page 118](#)
- ☐ Installation ➤ [page 118](#)
- ☐ Installation position: the circlip should face the planet pinion.

### 3 - Planet pinion

- ☐ If it is necessary to replace the planet pinion, the crown wheel should also be replaced ➤ [Item 16 \(page 131\)](#).
- ☐ If there is an inner ring as tapered roller bearing mounting, this should not be removed from the planet pinion.
- ☐ If scratches or damages are detected on the roller bearing mounting or inner ring, replace the planet pinion and the tapered roller bearing as a set.



### 4 - 4th gear wheel

- ☐ Installation position: the hub should face the 3rd gear ➤ [page 119](#)

### 5 - Circlip

### 6 - Circlip

### 7 - 3rd gear wheel

- ☐ Installation position: the hub should face the 4th gear ➤ [page 119](#)

### 8 - Circlip

### 9 - 2nd gear wheel

### 10 - Needle bearing

- ☐ For 2nd gear

### 11 - Inner ring for 2nd gear

- ☐ Wear check ➤ [page 119](#)
- ☐ Installation position ➤ [page 120](#)

### 12 - Outer ring for 2nd gear

- ☐ Install on inner ring ➤ [Item 11 \(page 115\)](#).
- ☐ Change in case of scratches or wear signs.
- ☐ Installation position ➤ [page 120](#)



13 - Synchronizer ring for 2nd gear

- ☐ Wear check ➔ [page 120](#)
- ☐ Installation position ➔ [page 120](#)

14 - Engaging sleeve with synchronizer for 1st and 2nd gears

- ☐ Remove with 2nd gear wheel after removing the circlip ➔ [page 119](#)
- ☐ Disassemble and assemble the engaging sleeve/synchronizer ring ➔ [page 120](#)
- ☐ Installation ➔ [page 121](#)

15 - Circlip

- ☐ Removal ➔ [page 119](#)
- ☐ Installation ➔ [page 121](#)

16 - Synchronizer ring for 1st gear

- ☐ Wear check ➔ [page 120](#)
- ☐ Install in order that the notches fit in the engaging sleeve limiters ➔ [Item 14 \(page 116\)](#) .

17 - Outer ring for 1st gear

- ☐ Install on synchronizer ring ➔ [Item 16 \(page 116\)](#) .
- ☐ Installation position ➔ [page 121](#)
- ☐ Change in case of scratches or wear signs.

18 - Inner ring for 1st gear

- ☐ Wear check ➔ [page 119](#)
- ☐ Check the flanges for wear signs.
- ☐ Installation position ➔ [page 122](#)

19 - Needle bearing

- ☐ For 1st gear.

20 - 1st gear wheel

- ☐ Installation position ➔ [page 122](#)

21 - Roller bearing support with ball bearing

- ☐ Check and replace whenever damaged.
- ☐ Clean the threaded holes of the roller bearing support (e.g. Tap M6).
- ☐ Removal ➔ [page 108](#)
- ☐ Installation ➔ [page 121](#)

22 - Gearbox housing

- ☐ Assignment ➔ [Electronic Parts Catalogue "ETKA"](#) .
- ☐ Repair ➔ [page 91](#) .
- ☐ Apply Sealing compound - AMV 188 200 03- evenly over the sealing surface of the gearbox housing.
- ☐ In case of replacement, always adjust differential ➔ [page 138](#) .

23 - 5th gear wheel

- ☐ Installation position: the hub shall face the gearbox housing side ➔ [page 86](#)

24 - Circlip

- ☐ Replace after each removal.
- ☐ Determine thickness ➔ [page 86](#) .

25 - Spring

- ☐ Installation position ➔ [page 121](#)

26 - Engaging sleeve

27 - Synchronizer

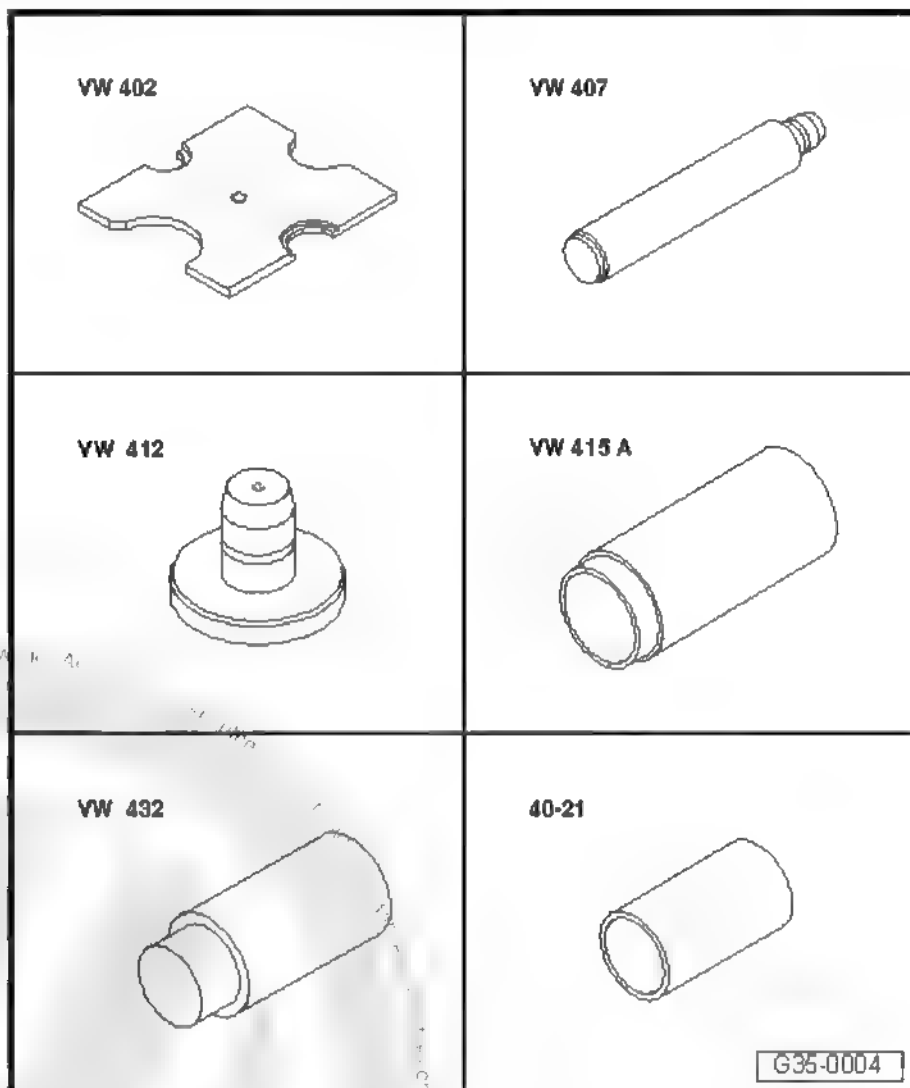
28 - Retainers

- ☐ 3 units



## 2.2 Planet pinion - disassemble and assemble

Special tools and workshop  
equipment required



- ◆ Plate - VW 402-
- ◆ Pressure pin - VW 407-
- ◆ Pressure disc - VW 412-
- ◆ Pressure tube - VW 415 A-
- ◆ Pressure base - VW 432-
- ◆ Support tube - 40-21-



◆ -1- 30 - 37mm Puller or VW 020P - Kukko 21/5-

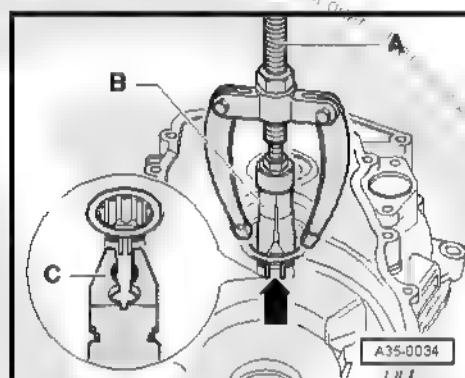
◆ -4- Auxiliary support - KUKKO 22/1-

Removing tapered roller bearing on clutch housing

A - Auxiliary support - KUKKO 22/1- .

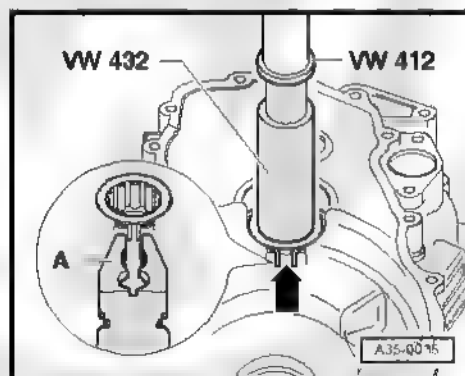
B - Puller 30 - 37mm or VW 020P - Kukko 21/5- .

- When removing it, compress the bearing circlip -arrow- with pliers -C-.



Installing the tapered roller bearing on clutch housing

- Support the clutch housing by placing the Pressure pipe - VW 415 A- (not shown in fig.) directly under the bearing support.
- When installing, compress the bearing circlip -arrow- with pliers -A-.
- Remove the pliers just before the bearing is in the correct installation position. The circlip shall be locked in the clutch housing hole.





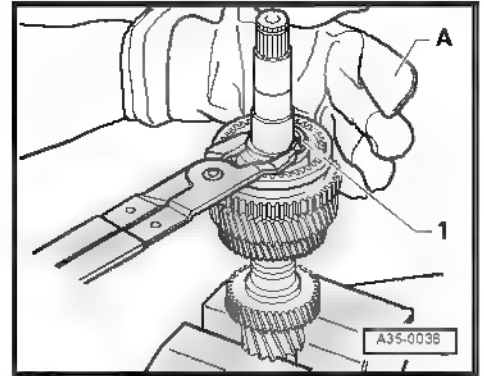
## Removing circlip -1- from notch

A - Safety sleeve



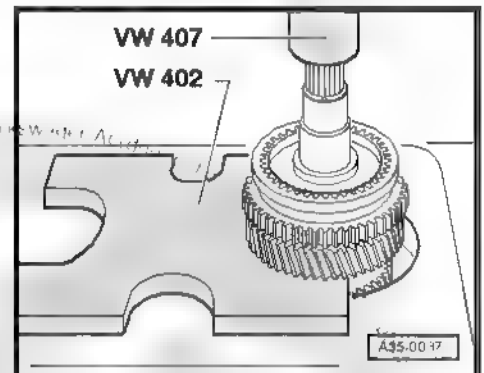
**WARNING**

*Carefully remove circlip.*



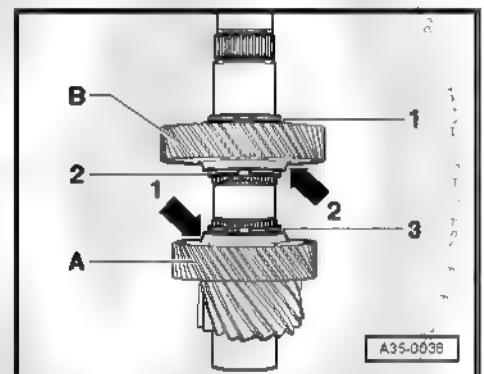
## Removing 1st and 2nd engaging sleeve/synchronizer

- After removing the circlip, disengage together the moving gear of the 2nd gear and the engaging sleeve with the synchronizer.



## Installation position of 3rd and 4th gear wheels

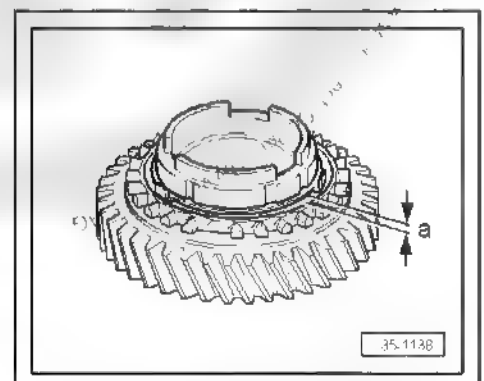
- Install 4th gear wheel -A- on planet pinion.
- The collar -arrow 1- shall face the 3rd gear wheel -B-.
- Install circlips -2- and -3-.
- Install 3rd gear wheel -B- on planet pinion.
- The hub -arrow 2- shall face the 4th gear wheel -A-.
- Install circlip -1-.



## Wear check of the inner ring of 1st and 2nd gears

- Press the inner ring against the gear cone and measure the distance -a- with a feeler gauge.

Distance -a-	New part	Wear limit
1st and 2nd gears	0,75 ... 1.25 mm	0.3 mm



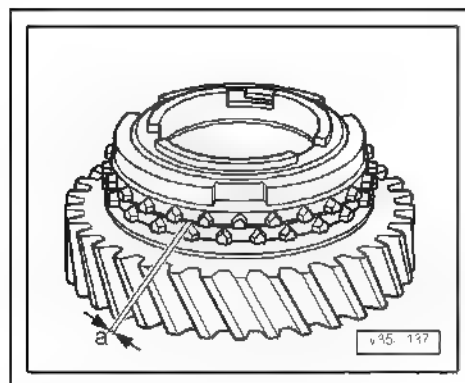




### Wear check of the synchronizer ring of 1st and 2nd gears

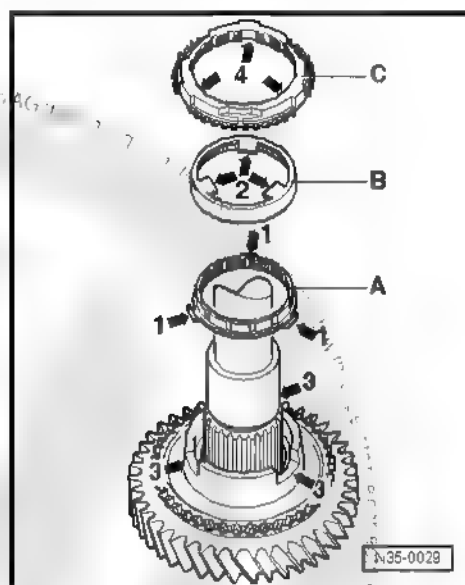
- Press the synchronizer ring, internal and external tracks against the gear cone and measure the distance -a- with a feeler gauge

Distance -a-	New part	Wear limit
1st and 2nd gears	1,2 ... 1 8 mm	0.5 mm



### Installation position of the outside and inner rings of the 2nd gear synchronizer ring

- Install inner ring -A- on the 2nd gear wheel. The curve shoulders -arrow 1- shall face the outer ring -B-.
- Install the outer ring -B- on top. The flanges -arrow 2- shall fit in the grooves -arrow 3- of the gear.
- Install the synchronizer ring -C- on top. The grooves -arrow 4- shall fit in the relieves -arrow 1- on inner ring -A-.



### Disassembling and assembling the 1st and 2nd gear engaging sleeve and synchronizer

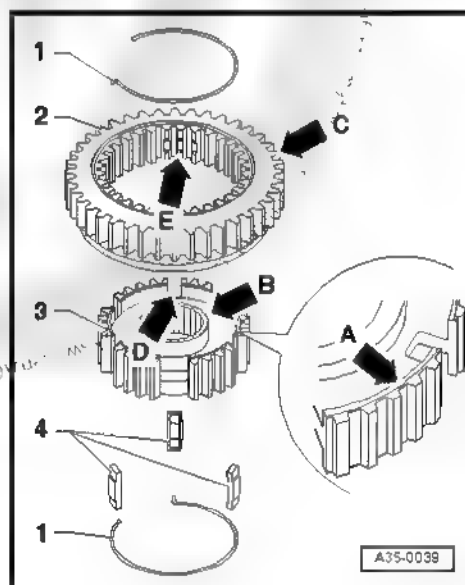
- 1 - Spring
- 2 - Engaging sleeve
- 3 - Synchronizer
- 4 - Retainer

- Press the engaging sleeve on the synchronizer.

The notch on front face -arrow A- and the wide collar -arrow B- shall face the external teeth on the engaging sleeve -arrow C- after installing.

The deeper grooves -arrow D- for the limiters located on the synchronizer shall match the notches -arrow E- on the engaging sleeve.

- Install the limiters in the deeper grooves -arrows-.





#### Assembling 1st and 2nd engaging sleeve/synchronizer

- Press the engaging sleeve on the synchronizer
- Install the limiters in the deeper grooves -arrows-.
- Install springs -B- and -C- displaced by -a-



Note

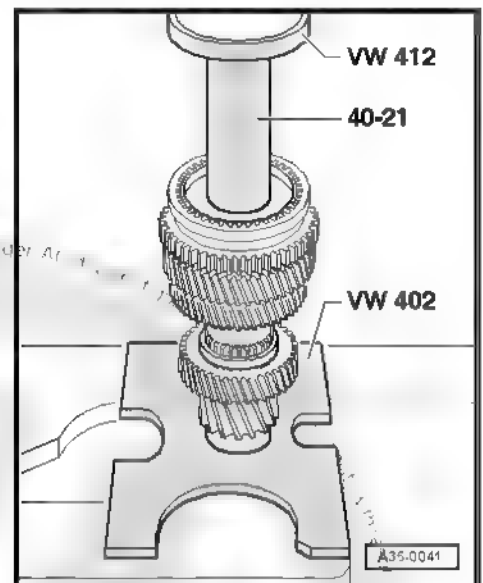
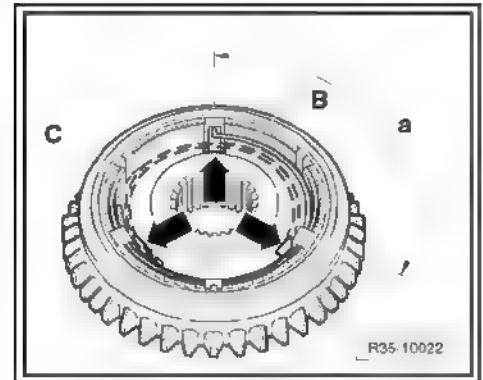
-a- = 120°.

- The folded end of the spring shall fit into the limiter's hole.

#### Installation of 1st and 2nd engaging sleeve/synchronizer

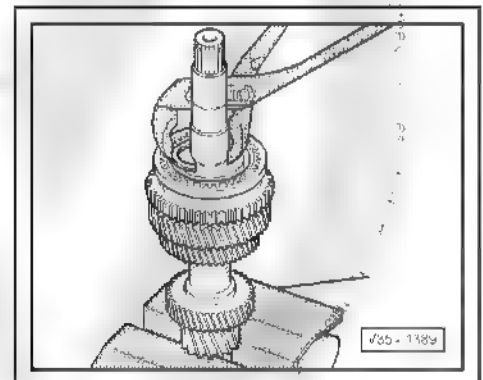
Installation position: The notch for the selector fork located on the lug sleeve must face the 1st gear and the teeth for the reverse gear towards the 2nd gear.

- Turn the synchronizer ring in order to match flanges and limiters.



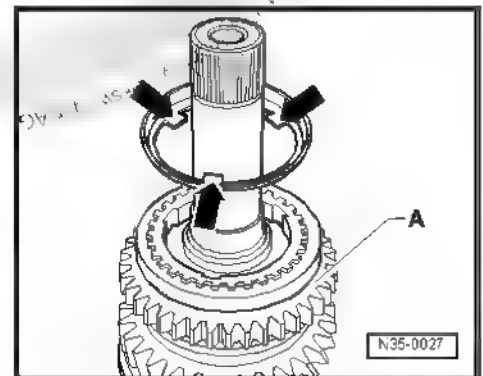
#### Installing circlip

- Install the 1st gear circlip on the engaging sleeve/synchronizer.



#### Installation position of the 1st gear outer ring

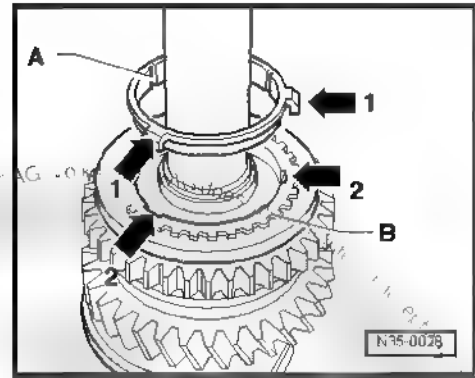
The flanges -arrows- shall face the teeth for reverse gear.





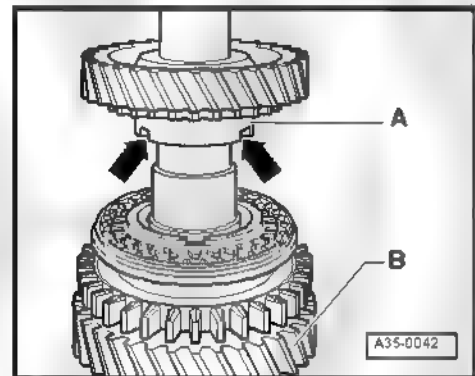
#### Installation position of the 1st gear inner ring -A-

The flanges -arrow 1- fit in the notches -arrow 2- on synchronizer ring -B-.



#### Installation position for 1st gear moving wheel

The tall collar -A- shall face the 2nd gear -B-. The collar notches -arrows- fit on the outer ring flanges -arrow-.





## 39 – Final drive - differential

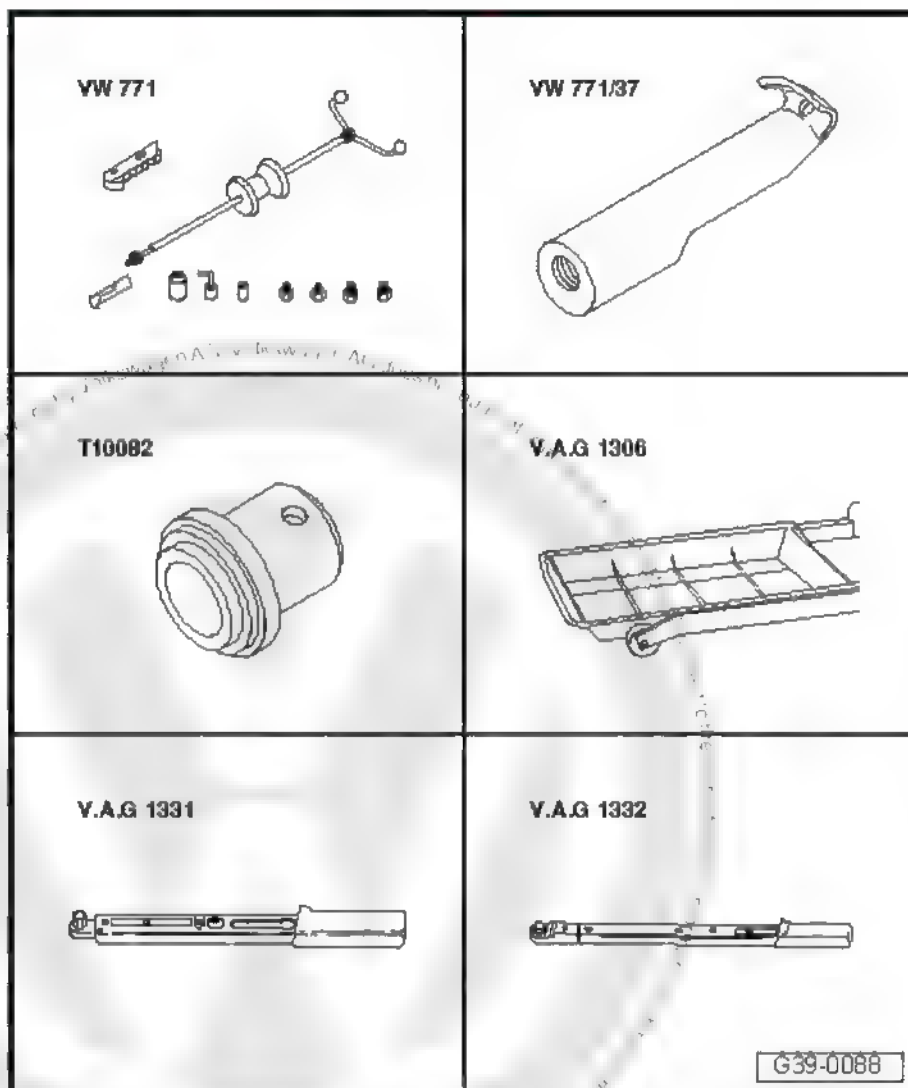
### 1 Drive flange

→ "1.1 Left drive flange retainer (left side) - replace", page 123

→ "1.2 Drive flange retainer (right side) - replace", page 126

#### 1.1 Left drive flange retainer (left side) - replace

Special tools and workshop equipment required



- ◆ Bush and roller bearing puller - VW 771-
- ◆ Complement - VW 771/37-
- ◆ Pressure base - T10082-
- ◆ Oil collecting tray - VAG 1306-
- ◆ Torque wrench - 5 to 50 Nm ( 1/2" drive) - VAG 1331-
- ◆ Torque Wrench - 40 to 200 Nm (fit. 1/2" drive) - VAG 1332-



## 1.1.1 Removal



### Note

*With the gearbox installed.*

- Lift the vehicle.
- Slightly loosen the screws -2- that fasten the drive shaft with constant velocity joint (left side) to the gearbox drive flange
- Remove the left side wheel.
- Turn the steering wheel to the left stop.
- Remove the screws -2- that fasten the drive shaft with constant velocity joint (left side) -3- to the transmission drive flange.

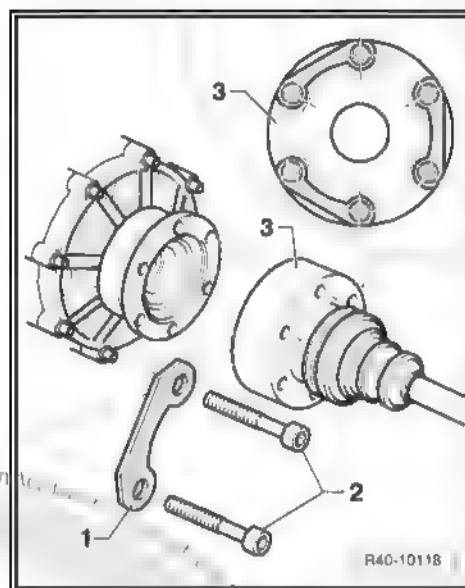


### Note

*The drive shafts with constant velocity joint must not be pressed downwards. Otherwise, the internal articulation will be damaged due to excessive tilt. Place the drive shafts upwards and fasten them with wire on the suspension strut.*

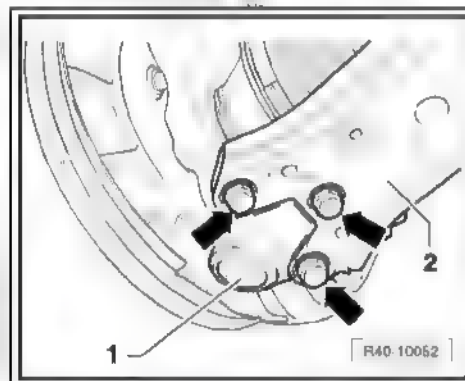
Continuation for vehicles with fastening screws in the support arm articulation guide:

- Mark the installation position of screws -arrows- of the articulation guide -1- in the support arm (cross-section) -2-.



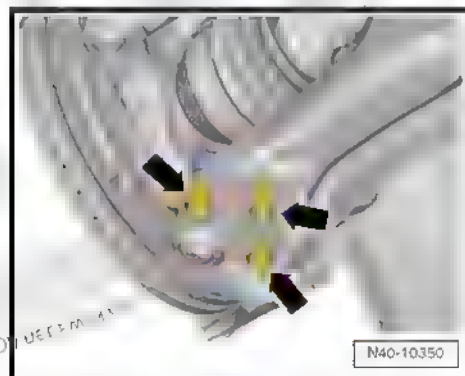
- Remove the securing bolts -arrows-.

Continuation for vehicles with fastening nuts in the support arm articulation guide:



- Remove the securing nuts -arrows-.

Continuation:



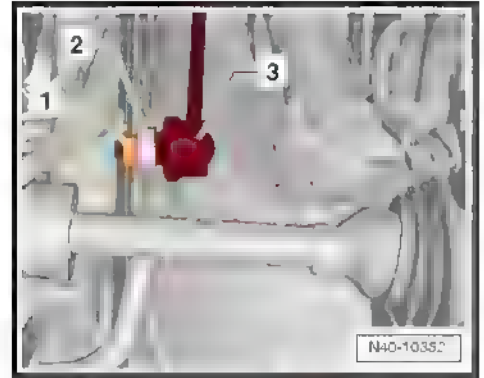


- Remove the hex nut -1- from coupling rod -3-.
- Remove the coupling rod -3- from the stabiliser -2-.
- Displace the suspension strut, pulling it away from the wish-bone (transversal)
- Place the final drive with constant velocity joint (left side) upwards and fasten it with wire on the suspension strut.

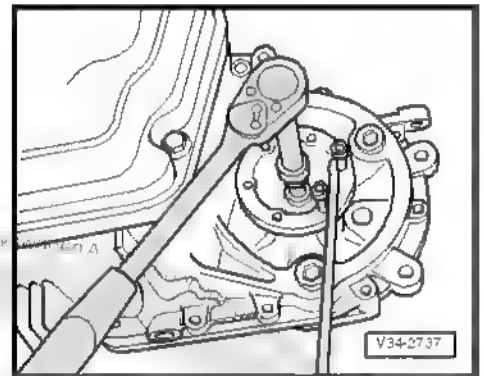


#### Note

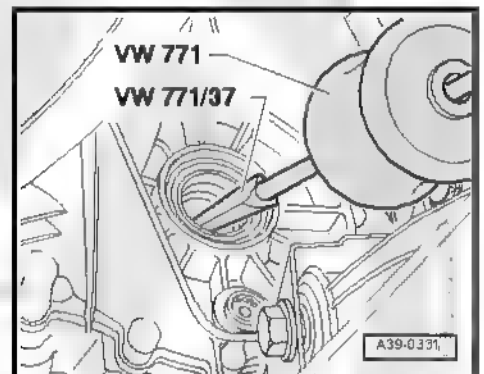
*The drive shafts with constant velocity joint must not be pressed downwards. Otherwise, the internal articulation will be damaged due to excessive tilting.*



- Remove the drive flange fastening screw by using two screws to lock the flange with a lever.
- Place the Oil collector - VAG 1306- under the gearbox.
- Remove the drive flange with the spring.



- Remove the drive flange retainer (left side) with the Bush and bearing puller - VW 771- and the Complement - VW 771/37-.



### 1.1.2 Installation



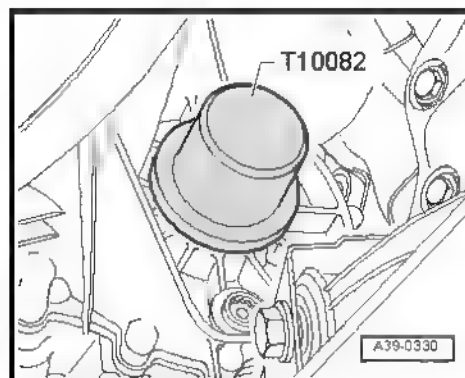
#### WARNING

- ◆ When handling chemicals follow the safety instructions ⇒ Chemical Products Manual; Rep. gr. 00
- ◆ Assignment of Chemical Materials ⇒ Electronic Parts Catalogue "ETKA"

Installation is performed in reverse to removal sequence, considering the following:

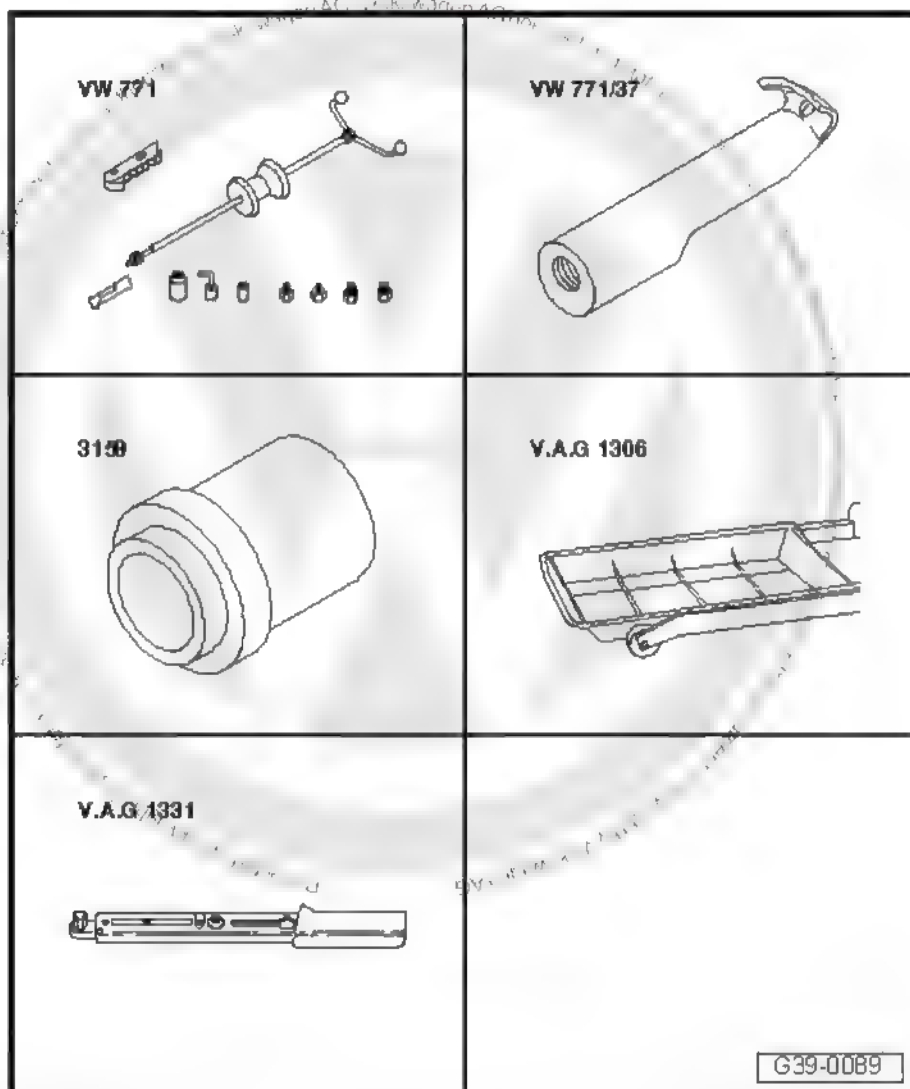


- Install the new retainer to the stop without tilting it.
- Fill the half space between the sealing lip and the boot with Grease - G.052.128 A1- .
- Install the drive flange, fastening it with the countersunk bolt. Tightening torque, see ➔ [Item 1 \(page 130\)](#) .
- Install the drive shaft with constant velocity joint (left side) onto the transmission drive flange. Refer to ➔ Chassis, axles, steering; Rep. gr. 40 ; Front suspension .
- Check gear oil level and fill, if necessary ➔ [page 87](#) .
- Install the left side wheel. Tightening torque, refer to ➔ Chassis, axles, steering; Rep. gr. 44 ; Vehicle wheels, tyres, measurement .



## 1.2 Drive flange retainer (right side) - replace

Special tools and workshop equipment required



- ◆ Bush and roller bearing puller - VW 771-
- ◆ Complement - VW 771/37-
- ◆ Fitting sleeve - 3158-
- ◆ Oil collecting tray - VAG 1306-





- ◆ Torque wrench - 5 to 50 Nm ( 1/2" drive) - VAG 1331-

## 1.2.1 Removal



### Note

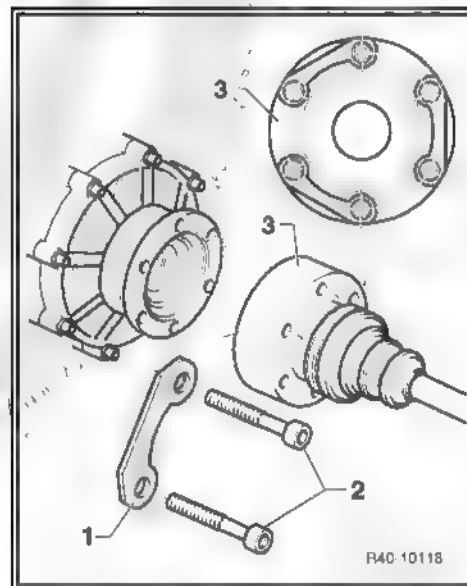
*With the gearbox installed:*

- Lift the vehicle
- Turn the steering wheel to the right stop.
- Remove the screws -2- that fasten the drive shaft with constant velocity joint (right side) -3- to the gearbox drive flange.
- Place the final drive with constant velocity joint (right side) upwards and fasten it with wire on the suspension strut.

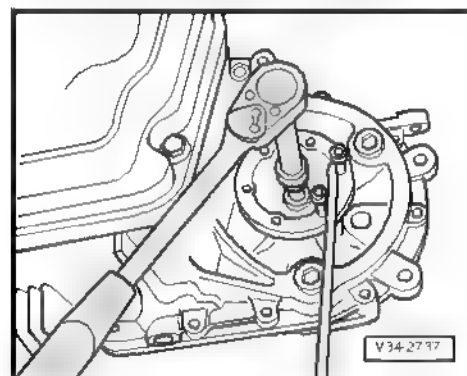


### Note

*The drive shafts with constant velocity joint must not be pressed downwards. Otherwise, the internal articulation will be damaged due to excessive tilting.*



- Remove the drive flange fastening screw by using two screws to lock the flange with a lever.
- Place the Oil collector - VAG 1306- under the gearbox.
- Remove the drive flange with the spring.

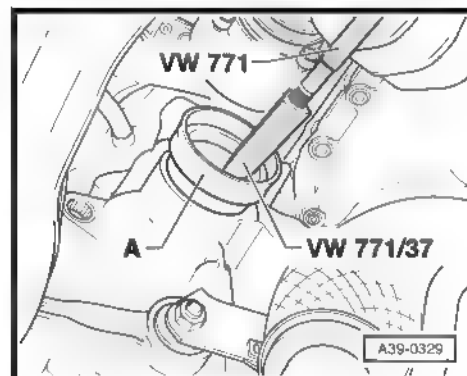


- Remove the drive flange retainer (right side) with the Bush and bearing puller - VW 771- and the Complement - VW 771/37- .



### Note

- ◆ Do not damage retainers -A-; otherwise, leaks may occur
- ◆ Replace the retainer, if damaged.





## 1.2.2 Installation

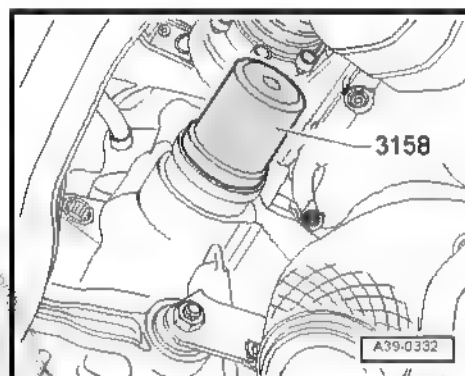


### WARNING

- ◆ *When handling chemicals follow the safety instructions ⇒ Chemical Products Manual; Rep. gr. 00*
- ◆ *Assignment of Chemical Materials ⇒ Electronic Parts Catalogue "ETKA"*

Installation is performed in reverse to removal sequence, considering the following:

- Install the new retainer to the stop without tilting it.
- Fill the half space between the sealing lip and the boot with Grease - G.052.128.A1-.
- Install the drive flange, fastening it with the countersunk bolt. Tightening torque, see ⇒ [Item 1 \(page 130\)](#).
- Install the drive shaft with constant velocity joint (right side) onto the transmission drive flange. Refer to ⇒ Chassis, axles, steering; Rep. gr. 40 ; Front suspension.
- Check gear oil level and fill, if necessary ⇒ [page 87](#).





## 2 Differential

➔ ["2.1 Differential - general overview of assembly", page 129](#)

➔ ["2.2 Differential - disassemble and assemble", page 132](#)

➔ ["2.3 Differential - adjust", page 138](#)

### 2.1 Differential - general overview of assembly



#### WARNING

- ◆ *When handling chemicals follow the safety instructions ➔ Chemical Products Manual; Rep. gr. 00*
- ◆ *Assignment of Chemical Materials ➔ Electronic Parts Catalogue "ETKA"*



#### Note

- ◆ *Heat inner ring of the tapered roller bearing to 100 °C before installing.*
- ◆ *Always change both tapered roller bearings as a set.*
- ◆ *Adjust the differential when replacing the tapered roller bearings, differential case, transmission housing or clutch housing ➔ [page 138](#).*



1 - Countersunk bolt

- ☐ 25 Nm
- ☐ Fasten on the threaded part  
➔ [Item 8 \(page 130\)](#) .

2 - Right drive flange

- ☐ Do not invert. The right and left drive flanges are different.

3 - Pressure spring for drive flange

- ☐ Installed behind the drive flange.

4 - Sealing washer

- ☐ Installation position: lip facing the pressure spring.

5 - Tapered ring

- ☐ Installation position: shoulder facing the differential case.

6 - Circlip

- ☐ Retains the tapered ring, sealing tapered washer and spring in position when the drive flange is removed.

7 - Planetary gear

- ☐ Installation ➔ [page 138](#)

8 - Flanged shaft nut

- ☐ Installation ➔ [page 138](#)

9 - Differential pinion pin

- ☐ Removal ➔ [page 137](#)
- ☐ Installation ➔ [page 138](#)

10 - Planetary gear

- ☐ Installation ➔ [page 138](#)

11 - Stop cover for planetary gears

- ☐ Install lubricated with gear oil.

12 - Left drive flange

- ☐ With retainer plate.
- ☐ Do not invert. The right and left drive flanges are different.

13 - Retainer for the left drive flange

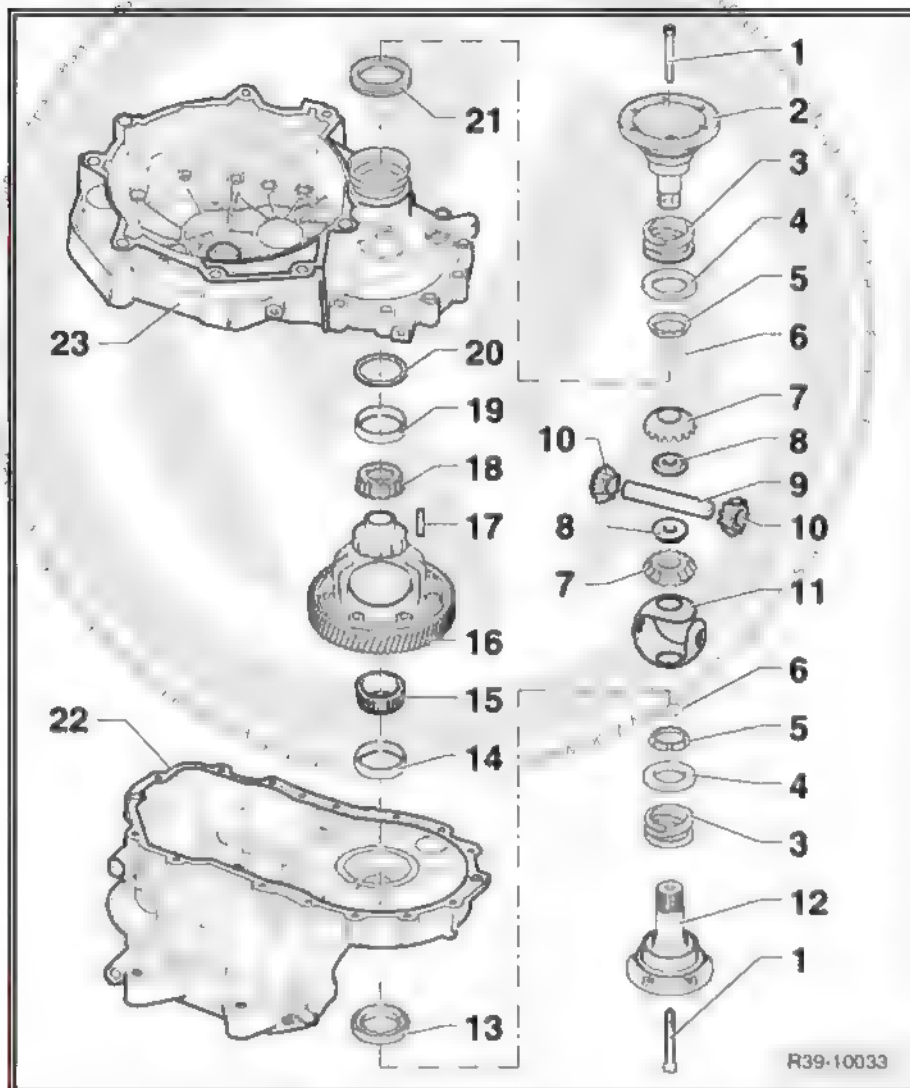
- ☐ Left and side diameters are different.
- ☐ Replace ➔ [page 123](#) .

14 - Outer ring on the tapered roller bearing

- ☐ Removal ➔ [page 135](#)
- ☐ Installation ➔ [page 136](#)

15 - Tapered roller bearing

- ☐ Removal ➔ [page 137](#)
- ☐ Installation ➔ [page 137](#)





**16 - Differential case**

- ☐ With riveted crown wheel
- ☐ If it is necessary to replace it, the pinion shaft shall also be replaced ➤ [Item 3 \(page 115\)](#) .

**17 - Elastic pin**

- ☐ To fasten differential pinion pin.

**18 - Tapered roller bearing**

- ☐ Removal ➤ [page 136](#)
- ☐ Installation ➤ [page 137](#)

**19 - Outer ring on the tapered roller bearing**

- ☐ Removal ➤ [page 136](#)
- ☐ Installation ➤ [page 136](#)

**20 - Adjustment shim S1**

- ☐ For the differential.
- ☐ Determine thickness ➤ [page 138](#) .

**21 - Retainer for the right drive flange**

- ☐ Left and side diameters are different.
- ☐ Replace ➤ [page 123](#) .

**22 - Gearbox housing**

- ☐ Assignment ➤ Electronic Parts Catalogue "ETKA" .
- ☐ Repair ➤ [page 91](#) .
- ☐ Apply Sealing compound - AMV 188 200 03- evenly over the sealing surface of the gearbox housing.
- ☐ In case of replacement, always adjust differential ➤ [page 138](#) .

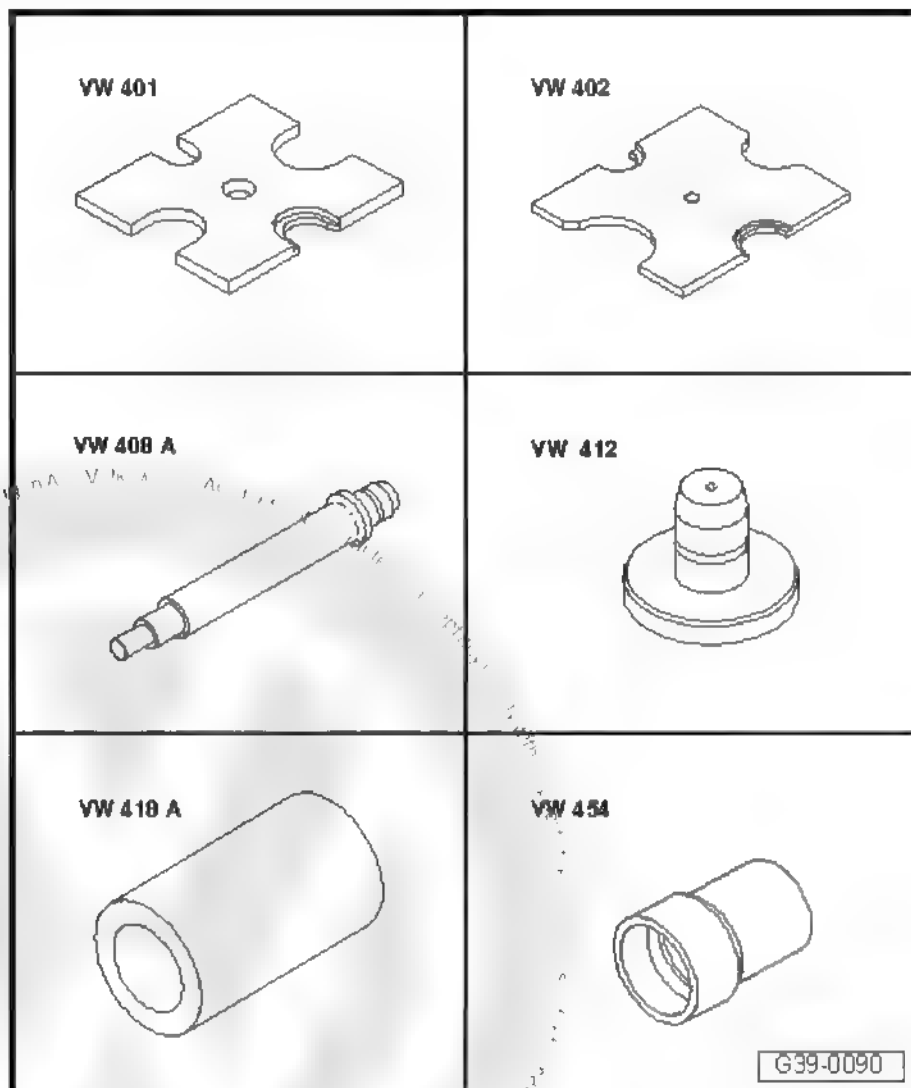
**23 - Clutch housing**

- ☐ Assignment ➤ Electronic Parts Catalogue "ETKA" .
- ☐ Repair ➤ [page 91](#) .
- ☐ Apply Sealing compound - AMV 188 200 03- evenly over the sealing surface of the gearbox housing.
- ☐ In case of replacement, always adjust differential ➤ [page 138](#) .

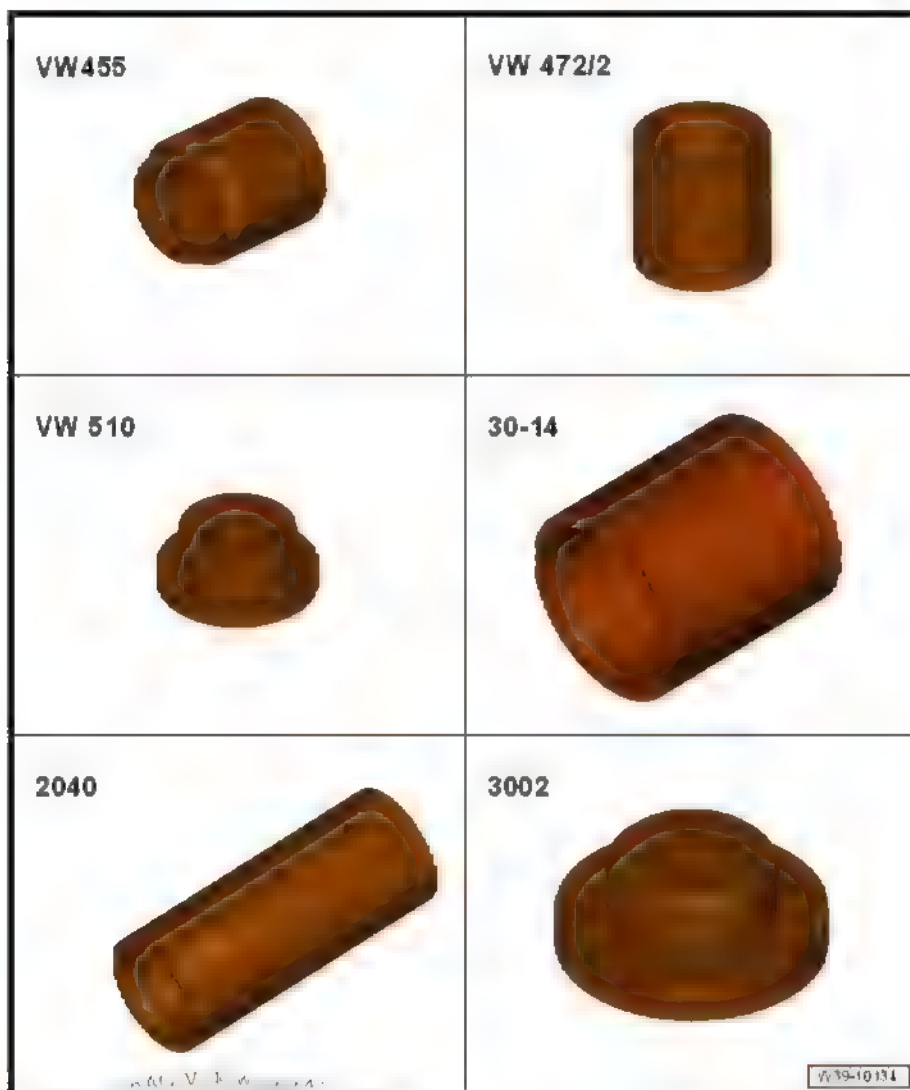


## 2.2 Differential - disassemble and assemble

Special tools and workshop  
equipment required

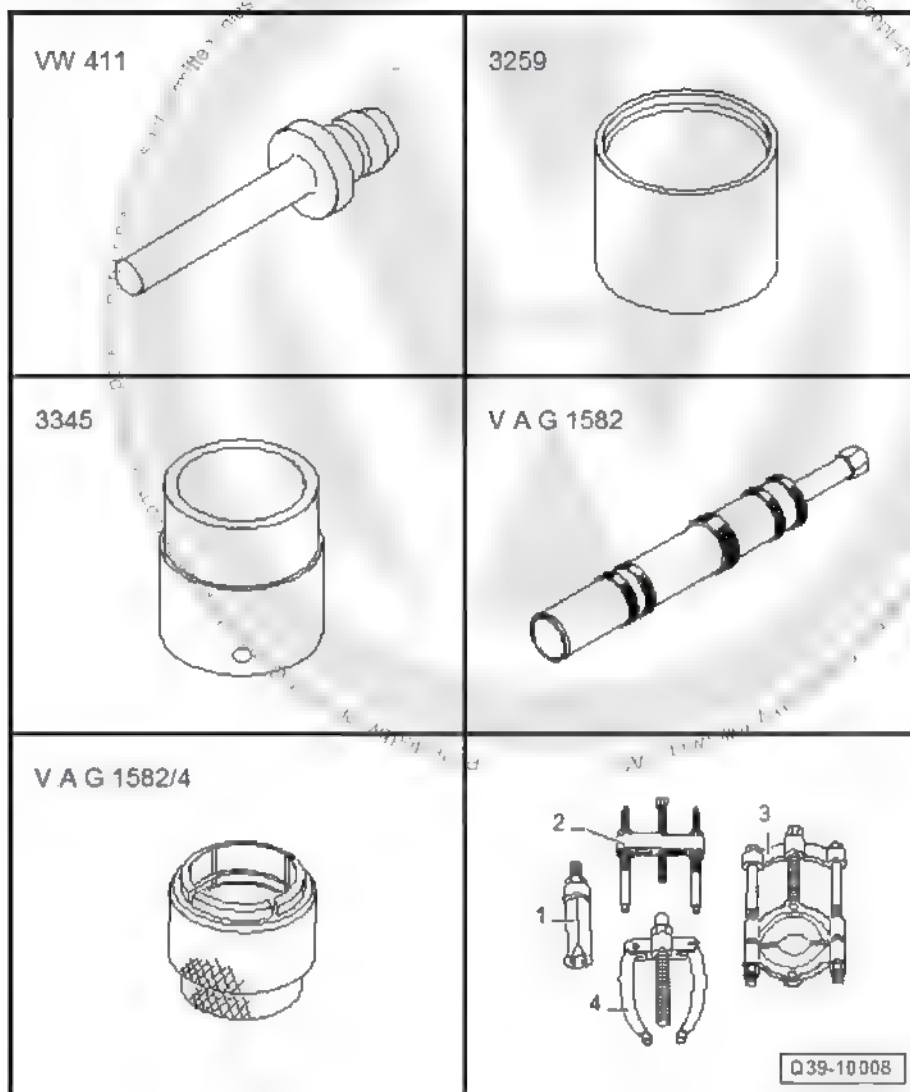


- ◆ Plate - VW 401-
- ◆ Plate - VW 402-
- ◆ Pressure pin - VW 408 A-
- ◆ Pressure disc - VW 412-
- ◆ Pressure tube - VW 418 A-
- ◆ Pressure tube - VW 454-



- ◆ Fitting tool - VW 455-
- ◆ Sleeve - VW 472/2-
- ◆ Pressure base - VW 510-
- ◆ Extractor tube - 30-14-
- ◆ Tube - 2040-
- ◆ Pressure base or 3002 - VW 3002-





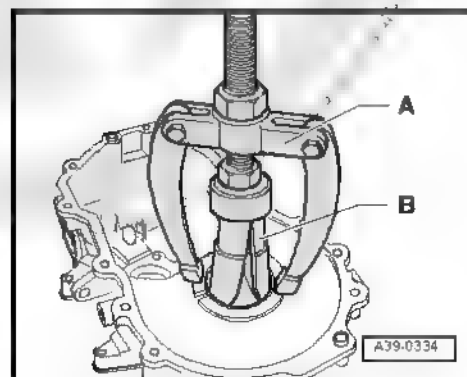
- ◆ Pressure pin - VW 411-
- ◆ Tube - 3259-
- ◆ Fitting tool - 3345-
- ◆ Bearing puller - VAG 1582-
- ◆ Calliper - VAG 1582/4-
- ◆ -1- 46 - 56 mm Puller or VW 020T - Kukko 21/7-
- ◆ -4- Auxiliary support - KUKKO 22/2-



- ◆ Pressure base or VW 062 - 30-205-
- ◆ Support tube - 40-21-
- ◆ Torque wrench - 5 to 50 Nm (1/2" drive) - VAG 1331-
- ◆ Calliper - VAG 1582/3-

Removing the outer ring on the tapered roller bearing of the gear-box housing

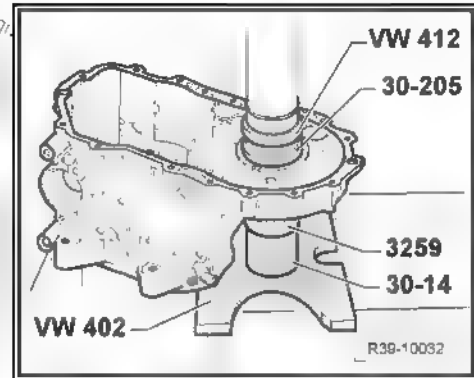
- A - Auxiliary support - KUKKO 22/2- .
- B - Puller 46 - 56mm or VW 020T - Kukko 2167- .





Installing the outer bearing race of the tapered roller bearing on the gearbox housing

- Support the gearbox housing by placing the Tube - 3259- directly below the bearing support.



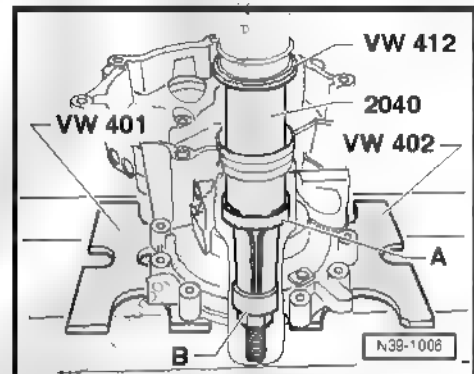
Removing the outer race from the tapered roller bearing -A- of the clutch housing

- Use Puller 46 - 56mm or VW 020T - Kukko 21/7- -B- to remove the outer race from the tapered roller bearing.



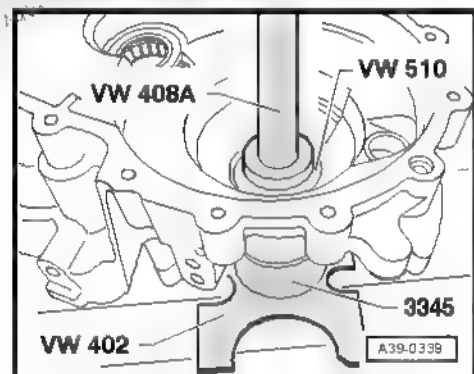
**Note**

*Remove the Speed sensor - G22- before removing the outer race from the tapered roller bearing.*



Installing the outer race on the tapered roller bearing of the clutch housing

- Support the clutch housing by placing the Fitter - 3345- directly below the bearing support.
- Install the Speed sensor - G22- after installing the outer bearing race.



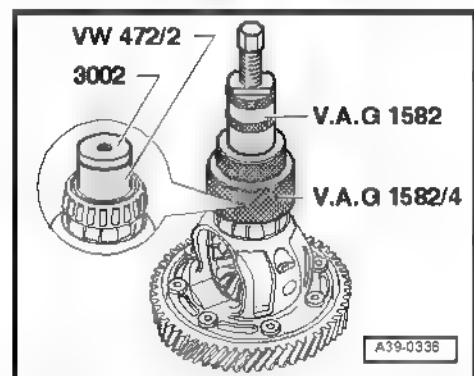
Removing the inner ring from the tapered roller bearings

- Before installing the puller, install Sleeve - VW 472/2- - VW 472/2- and the Pressure base or VW 3002 - 3002- on top the differential case.



**Note**

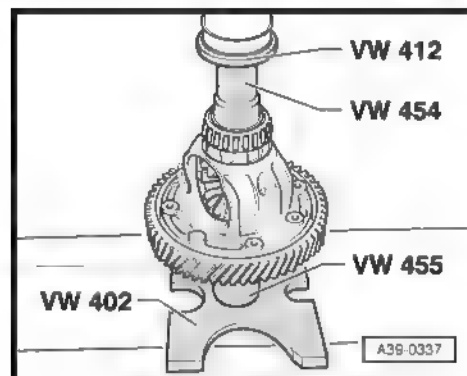
*The internal tracks on both roller bearings are removed in an identical way as for the differential case.*





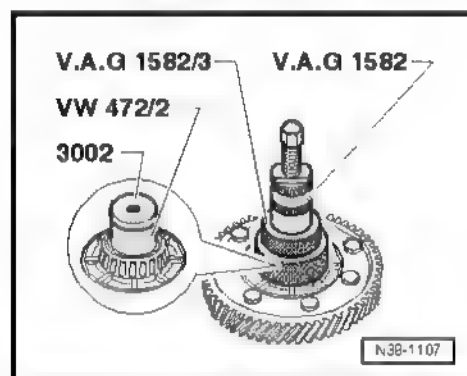
#### Installing the inner ring on the tapered roller bearings

- Support the inner ring on the opposite side with the Fitter - VW 455- .



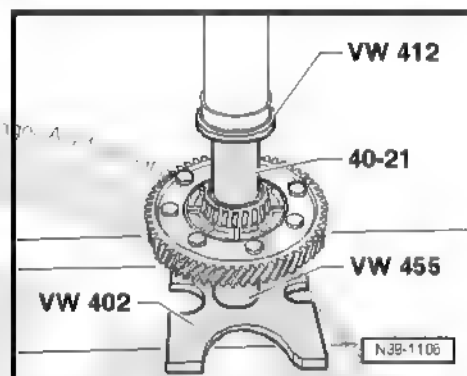
#### Removing the inner ring from the tapered roller bearing

- Before mounting the pulling device, place the Sleeve - VW 472/2- and the Pressure base or VW 3002 - 3002- in the planetary gear box.



#### Installing the inner ring on the tapered roller bearing

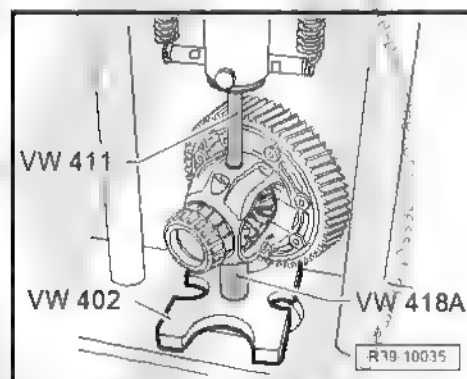
- Support the inner ring on the opposite side with the Fitter - VW 455- .



#### Removing the differential pinion pin

Press the elastic pin until it shears, to remove the shaft.

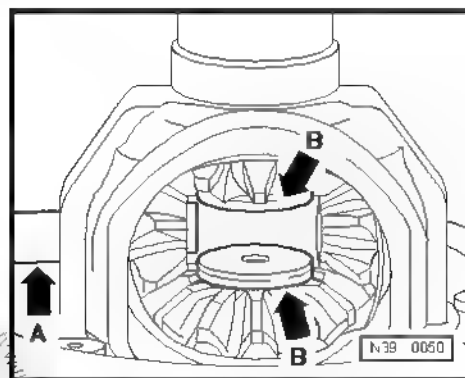
- Remove the elastic pin remains from the differential case.





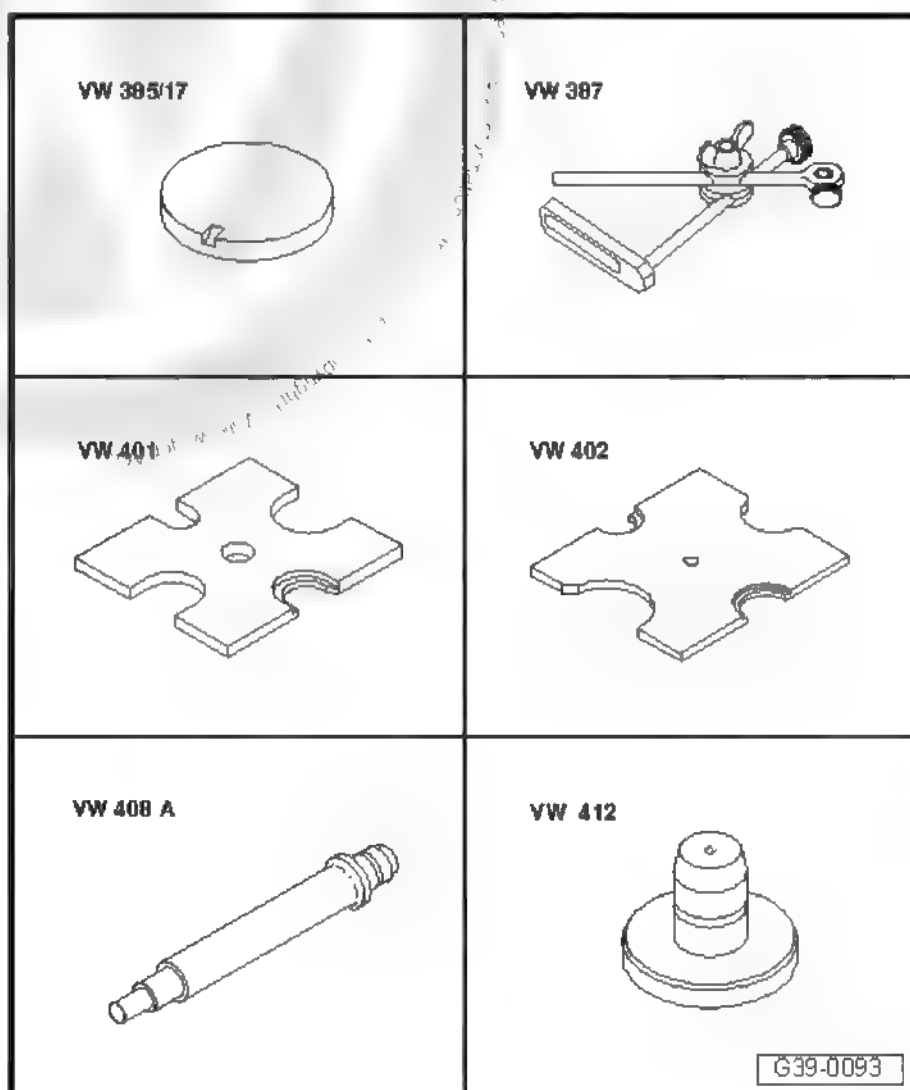
### Installing the planetary and planetary gears

- Lubricate the stop cover of the planetary gears with gear oil.
- Install the two planetary gears and lock them (for example, with the drive flange)
- Install the satellite gears displaced by 180°
- Install the differential pinion pin -arrow A- to the first planetary gear
- Install nuts -arrows B- on the planetary gears. Installation position: edge facing the planetary gear.
- Install the differential pinion pin to the stop and fasten it with the elastic pin.



## 2.3 Differential - adjust

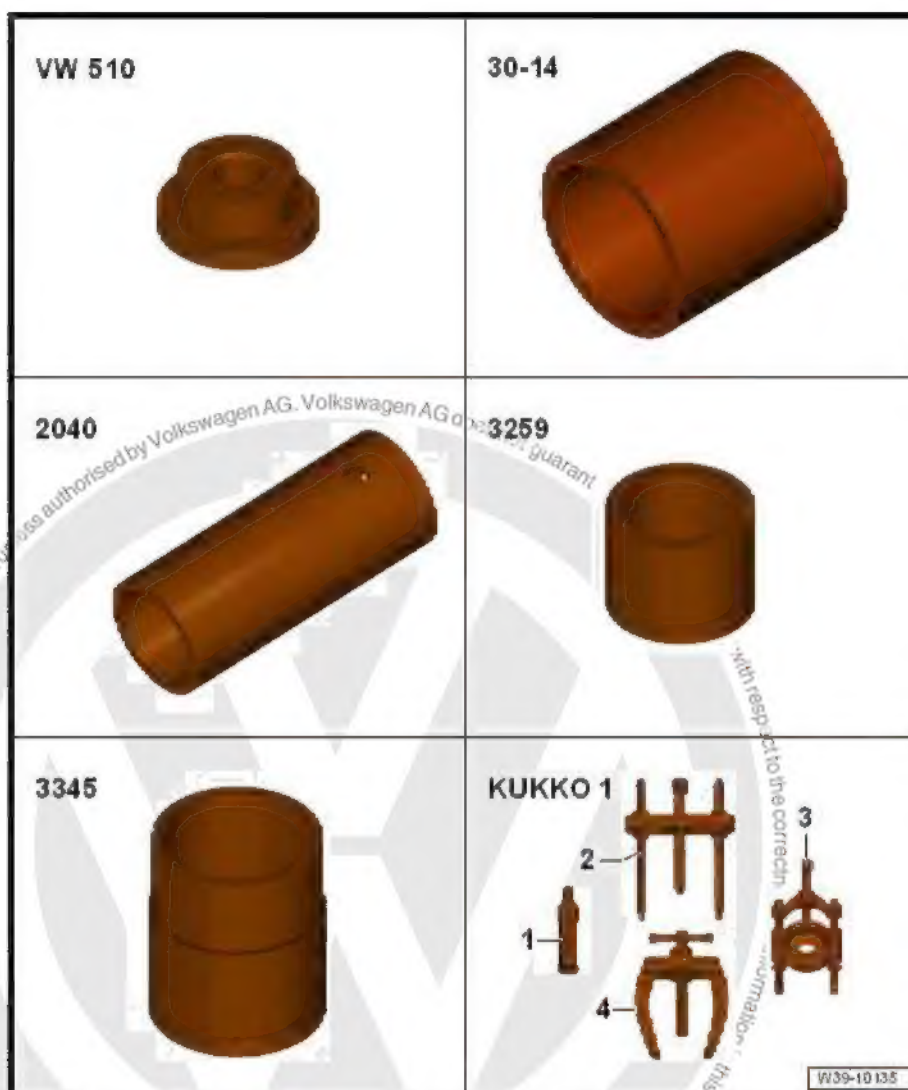
Special tools and workshop equipment required



- ◆ Measuring disc or VW 385 - VW 385/17-
- ◆ Mounting bracket - VW 387-
- ◆ Plate - VW 401-
- ◆ Plate - VW 402-



- ◆ Pressure pin - VW 408 A-
- ◆ Pressure disc - VW 412-



- ◆ Pressure base - VW 510-
- ◆ Extractor tube - 30-14-
- ◆ Tube - 2040-
- ◆ Tube - 3259-
- ◆ Fitting tool - 3345-
- ◆ -1- 46 - 56 mm Puller or VW 020T - Kukko 21/7-



30-205



W00-11121

◆ Pressure base - 30-205-

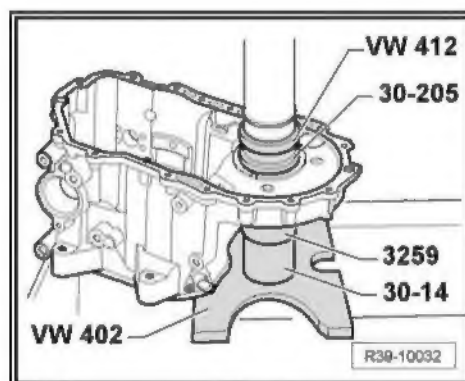
The differential shall be adjusted when replacing the following components:

- ◆ Gearbox housing.
- ◆ Clutch housing.
- ◆ Differential box.
- ◆ Tapered roller bearings of the differential.
- Installing the outside ring of the tapered roller bearing (pinion side) on the gearbox housing ⇒ [page 136](#) .



Note

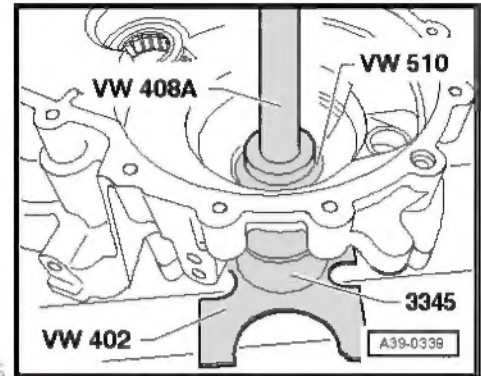
*The inside and outside tracks of the tapered roller bearings form an assembly (pairs) and should not be inverted.*







- Install the outer bearing race (opposite side of pinion) on the clutch housing without adjustment shim.
- Install the differential on the clutch housing.
- Install the gearbox housing and tighten the 5 bolts to the corresponding tightening torque [⇒ Item 3 \(page 76\)](#).



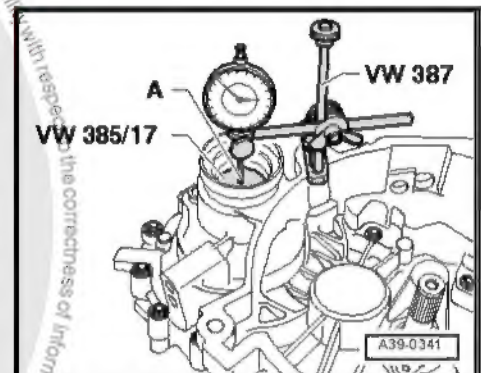
- Install the measuring device and the dial gauge by using an extender -A- of approx. 30 mm.  
Reset the dial gauge to zero with 1-mm pre-tension.  
Move the differential upwards and downwards, read the clearance on the dial gauge and write down (in the example: 1.50 mm).

#### Determine adjustment shim thickness S<sub>1</sub>

The pre-tension required for the roller bearing is achieved by adding a constant pressure value (0.35 mm) to the value achieved during the measurement for S<sub>1</sub>.

Example:

Measured value	1.50 mm
+ pressure (constant value)	0.35 mm
Adjustment shim S <sub>1</sub> thickness =	1.85 mm

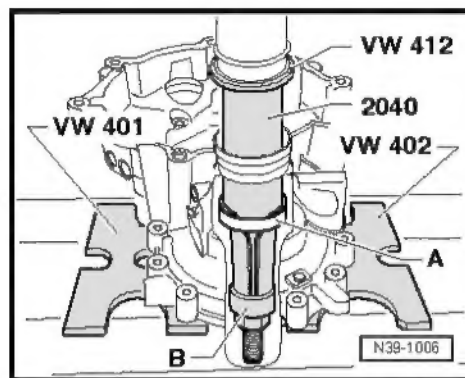




- Remove the clutch housing and the outer bearing race -A-.
- B - Puller 46 - 56 mm or VW 020T - Kukko 21/7- .
- Install adjustment shim S<sub>1</sub> with the corresponding thickness (in the example, 1.85 mm) and reinstall the outer bearing race in the clutch housing ⇒ [page 136](#)

Adjustment shims:

Thickness (mm)	Replacement parts No.
0.65	-02K 409 210-
0.70	-02K 409 210 A-
0.75	-02K 409 210 B-
0.80	-02K 409 210 C-
0.85	-02K 409 210 D-
0.90	-02K 409 210 E-
0.95	-02K 409 210 F-
1.00	-02K 409 210 G-
1.05	-02K 409 210 H-
1.10	-02K 409 210 J-
1.15	-02K 409 210 K-
1.20	-02K 409 210 L-
1.25	-02K 409 210 M-
1.30	-02K 409 210 N-
1.35	-02K 409 210 P-
1.40	-02K 409 210 Q-



The existence of different tolerances enables calibrating the required shim thickness with accuracy.

If the required thickness for the adjustment shim is greater than that indicated on the table, install 2 shims which thickness sum is equivalent.

- Install the gearbox housing and tighten the fastening screws. Tightening torque, see ⇒ [Item 3 \(page 76\)](#) .